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ABSTRACT

This program introduces the young computer players to the world of the grizzly bear, the largest land carnivore in North America. Through a series of four interactive stories, players learn of the bear's habits and human activities that have brought it close to extinction. Playing the part of a park ranger, a research biologist or a natural resource developer, the player searches for creative solutions to the conflicts between man and the bear. Part 1 describes the operating instructions for the program including booting, signing on, choosing a story, and record-keeping. Part 2 presents the facts on a grizzly bear including the history, distribution, food, hibernation, research, and wildlife management. Part 3 provides 15 activities focusing on scientific concepts common to all living creatures, and a table of curriculum guides containing descriptions of specific skills and the activities developing the skill. In each activity, the description, objective, background, materials, procedure, extension, and evaluation are described. Worksheets and a glossary are appended. There are 23 references. (YP)

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AUDUBON

Wildlife Adventures™

GRIZZLY GUIDEBOOK

School Edition

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System Requirements

To use the *Grizzly Bears* diskette, you will need the following equipment:

Apple® *IIe* version
An Apple *IIe, IIc,* IIcPlus, IIGS or a compatible computer with at least 128K RAM, one disk drive (5.25" or 3.5") and a monitor. A mouse is optional.

Apple IIGS version
An Apple IIGS with at least 512K RAM and one 3.5" disk drive. It does not support a second disk drive, and it will not run from a hard disk drive.

IBM version
An IBM PC, PCjr., PC AT, PC XT, PS/2 or compatible computer with PC/MS DOS 2.0 or higher. A color graphics adaptor (CGA), a minimum of 256K RAM and one double-sided disk drive (5.25" or 3.5").

All versions
A color monitor is recommended for full appreciation of the color graphics.

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Addendum for the Apple IIGS Version

This replaces the Booting Grizzly Bears *section in the* OPERATING INSTRUCTIONS.

To start *Grizzly Bears* on your IIGS, place Disk 1 in the 3.5" Drive 1 of your system. (Place the disk stamped "Disk 2" in Drive 1 when prompted by the program.)

Turn on your monitor, then turn on your computer. You will see a box that says, "Welcome to the II GS," and a bar will fill with red as the *System* and *Finder* load. A disk icon will appear in the upper right corner of the screen, and a bear icon will emerge to the left of the screen..

Launch *Grizzly Bears* by moving the mouse pointer to the icon called GRIZZLYBEARS, and double-click the mouse button.

Note: This version of the program uses a custom *System*, and it may not launch from the *System* that came with your computer.

Addendum for the IBM Version

This replaces the Booting Grizzly Bears *section in the* OPERATING INSTRUCTIONS. *It is necessary to follow the instructions each time you use* Grizzly Bears.

To start *Grizzly Bears,* do the following:

Step 1: Turn on the monitor, then turn on the computer.
Step 2: Boot *DOS* from your standard system diskette.
Step 3: Place Disk 1 of *Grizzly Bears* in any drive. (Note: Do not write-protect Disk 1.)
Step 4: At the prompt (>), log on to the drive into which you have placed Disk 1 by typing the letter designation of the drive followed by a colon, and press (ENTER).
Step 5: At the prompt, type **Grizzly** and press (ENTER).

The remainder of the instructions are accurate regarding the IBM, with the following exceptions:

1. Each time you see " RETURN," read "ENTER."
2. Ignore any mention of "Drive 1." *Grizzly Bears* will work in any drive.
3. Each time you see "Side 1," read "Disk 1"; each time you see disk "side," read "disk."
4. Use the backspace key, instead of DELETE, to erase a typed letter.
5. *Grizzly Bears* does not support a mouse.
6. Refer to your DOS manual for instructions on installing Grizzly Bears to your hard disk (fixed disk) drive.

OPERATING INSTRUCTIONS

PART ONE: OPERATING INSTRUCTIONS

Getting Started

Protecting the Grizzly Bears Diskette(s)
The *Grizzly Bears* program comes on floppy disks, or diskettes. Always keep the program diskettes, and any others you might have, in their protective sleeves and away from anything magnetic (including televisions). Never use any hard-tip or ballpoint pens when labeling a diskette; use only soft, felt-tip pens which will not damage the surface of the disk. Because diskettes are extremely sensitive, they should be handled carefully, and nothing should be allowed to touch the surface of the disk itself.

Using the keyboard
Most functions in *Grizzly Bears* can be done with a mouse. If you do not have a mouse, you will find these keys useful:

↑ ↓	To move the highlight/cursor up and down menus or data base lists
↑ ↓ ← →	To move the + sign or other symbol across maps or other graphics
RETURN	To tell the computer you have made a choice, or to go to the next screen
DELETE	To erase a typed character
ESC	To stop a game or return to a menu

Inserting the Grizzly Bears Diskette(s)
Insert the *Grizzly Bears* diskette into the drive with the label(s) between your fingers. Lift open the door of the disk drive, and gently slide in the diskette, exposed end first. Diskettes should never be forced into the drive. With the diskette fully inserted, close the disk drive door.

Booting Grizzly Bears
To use the program, you must first boot the diskette. Booting a diskette means starting up the disk drive from the beginning. The following instructions describe how to boot *Grizzly Bears:*

1. Start with the computer turned off.
2. With Side 1 of the *Grizzly Bears* diskette face up, gently insert the diskette in Drive 1, then close the disk drive door. (Note: Do **not** place a write-protect tab over the notch on Side 1.)
3. Turn on the monitor. Then turn on the computer. *Grizzly Bears* will load and run automatically. (If the title screen does not appear within 30 seconds, repeat the booting procedure. If the program does not run after several tries, the disk may be damaged.)
4. If using a color monitor, adjust the color so that the bear on the title screen is brown.

Signing In
The first thing you will be asked to do when *Grizzly Bears* appears on your screen is to sign in. Just use the keyboard to type the letters of your name. The computer will accept up to 10 letters. If your first name is longer than that, just type in a nickname. Then press RETURN, or use the mouse button.

Next you will be asked to type your last name. Type it, and press RETURN, or use the mouse button.

Note: Each time you sign in, be sure to use exactly the same name, so the computer will know who you are. For example, if your name is Michael, sign in as *Michael* each time, but do not switch to *Mike*, or the computer will think you are two different people. When you sign in with a name the computer knows, it looks at what you have done to make sure you see something new.

Signing in lets you explore four grizzly adventures. The stories are different each time you play , so you can play them again and learn more about grizzlies each time. The computer will keep track of which stories you have played, so you can look back later and see how many times you completed each story.

After you sign in, you will be presented with the *Main Menu:*

MAIN MENU

1. On the Spot with Dr. Potts
2. Bear Encounters
3. Grizzly Bear Mystery
4. Oil Explorer
5. Bear Country Handbook
6. Grizzly Food Data Cards
7. Grizzly Habitat Model
8. Utilities
9. Quit

To choose, use the arrows, the mouse or the numbers. Then press RETURN.

The first four items on the menu are the stories on the *Grizzly Bears* diskette(s). The next three items are other programs you can use to explore the world of the grizzly, and they are explained later in this section. The eighth item allows for turning off the sound and for record-keeping. The last item allows you to leave the program.

Each story builds on the knowledge gained in previous stories. We suggest starting with the first story and moving on from there. The *Handbook*, the *Data Cards* and the *Model* are introduced in the stories. Once you have learned a little bit about these tools, you can use them directly from the *Main Menu*.

Choose A Story

Press the up or down arrows, or use the mouse or the number keys, to move the cursor to the name of the story you want. Then press RETURN, or use the mouse button.

A message may appear asking you to put a different side of the *Grizzly Bears* diskette(s) in Drive 1. When this message appears, open the disk drive door and remove the diskette. Find the requested side, put it face up in Drive 1, close the disk drive door, and press RETURN or use the mouse button.

The first screen of the story will appear, and you will be off on a grizzly bear adventure!

What's The Story?

In each story, you will be asked to play the role of a person whose life is intertwined with the grizzly. You will be asked questions, and you will have to make decisions that affect both grizzlies and people. Sometimes you will not know what to do. But you will meet people in the stories who can help you. By using the help they will give you, you will learn what you need to know to solve the problem.

Classroom Record-keeping

The *Utilities* allow you to turn the sound on and off. They also provide a record-keeping system.

The record-keeping system keeps track of how many adventures in each story have been completed. It does this so you will not have to repeat an adventure. If you wish to see how many adventures you have completed, use the *View a Record* selection from the *Utility Menu*.

The record-keeping tool is particularly powerful in the classroom. It allows the teacher to see how far each of his or her students have progressed on the diskette.

Please note that the students' names are listed on the left. The numbers at the top of the screen represent the following: **1**: *Story 1*; **2**: *Story 2*; **3**: *Story 3*; **4**: *Story 4*; **5**: *Bear Country Handbook*; **6**: *Grizzly Food Data Cards*; and **7**: *Grizzly Habitat Model*.

The numbers to the right of the students' names indicate how many times each of them has completed a mission in the story represented by the numbers listed above, or how often the corresponding tool was used.

Story 1: On the Spot with Dr. Potts

You are on vacation in the Great Rock National Park when you spot a huge grizzly. What should you do? Run away? Keep quiet? You will have to make a quick decision and hope for the best. Too bad that you have not yet met Dr. Potts. She would know what to do. She has been studying those amazing creatures for over 30 years. She can help you learn what every hiker should know about grizzlies.

When you meet Dr. Potts, she will give you an old, tattered copy of the *Bear Country Handbook*. Look through it, and you will see how much exciting information there is to know about these bears.

What if you could be Dr. Potts' assistant? Well, she is in need of help, and if you pass a little quiz she gives, you will find yourself right in the middle of her missions through bear country. Ask her for help if you need it during the quiz.

Once you become Dr. Potts' assistant, each mission in which you accompany her will become more challenging, but you will be given more and more tools to help you in your adventures.

On some missions in this story, you will track down a grizzly by using your knowledge of the area and of the foods that grizzlies eat during each season. On other missions, you will get to use a radio receiver to track a grizzly that is wearing a radio collar.

If you think that you are a grizzly whiz, you can plunge right in. But, if you are a greenhorn, do not worry — Dr. Potts will be at your side throughout each mission. With her guidance, the help of the on-line *Bear Country Handbook* and the tools in her portable computer, you will learn what you need to know!

Using the Maps

Dr. Potts has a map of each area that you will explore. Here are some helpful hints for moving around the territory using those maps:

- Use the mouse or the arrow keys to move the graphic of the person that represents your character.

- If you are not sure what to do, press an arrow key or move the mouse. Your character will move, and you will get a response from Dr. Potts or a report about where you are.

- You will find that you may not be able to pass through rivers and forests at one place, but if you try other locations, you will eventually find a spot that is passable. Explore the entire area represented by the map until you discover a grizzly.

- To help locate a grizzly, Dr. Potts has marked on her map where the seasonal foods of the grizzly are found. Since bears need to eat, you will probably be most successful if you head toward the food source for the current season.

Bear Country Handbook

Where can you go to find all you need to know about grizzly bear behavior? The on-line *Bear Country Handbook*, of course. It is a great source of information about what grizzlies look like, where they can be found and how to behave in bear country. Reading the *Bear Country Handbook* is the best way to prepare for missions with Dr. Potts.

You can get to the *Handbook* either from the *Main Menu* or during the story after Dr. Potts hands it to you. To get to this tool from the *Main Menu*, use the arrow keys or a mouse, or press a number to move the cursor to *Bear Country Handbook*. Press RETURN, or use the mouse button. The *Bear Country Handbook* menu will appear:

THE BEAR COUNTRY HANDBOOK
by Dr. Martha Potts

1. What a Grizzly Bear Looks Like
2. Grizzly Bear Habits
3. Studying Grizzlies
4. Grizzlies and Garbage
5. Grizzly Bear History
6. Grizzlies Today
7. Visiting Grizzly Country
8. Return to the Main Menu

To choose, use the arrows, the mouse or the numbers. Then press RETURN.

To make a choice from this menu, highlight the chapter you want to read. Press RETURN, or use the mouse button, and the first screen of that chapter will appear. If you want to get back to the menu before you are finished with the chapter, press ESC. To return to the story you were reading, choose the last option from the menu, *Return to the Main Menu.*

Here is what you will find in the seven chapters of the *Handbook:*

- A description of grizzlies, including details about weight, size and color.
- Information about where grizzlies migrate at each time of the year and details about bear behavior.
- A discussion of how scientists study grizzlies, and a description of two of the tools that they use.
- An explanation of the problems created by the garbage that tourists leave behind in parks.
- A description of the history of grizzlies in the U.S., where bears lived in the past and where they can be found today.
- A description of what conservation groups are doing to help save the grizzly from extinction.
- Instructions telling how to be safety-conscious when traveling or camping in bear country and what to do when you meet or see a bear.

Grizzly Food Data Cards

Dr. Potts has put together a data base on her portable computer. It contains all kinds of information on the foods that grizzlies eat — ranging from animals, such as ants and elk, to plants, like whitebark pine. You will learn where these foods can be found, what they look like and at which time of year they are most likely to be eaten.

During your third mission, Dr. Potts will introduce you to the data base. If you want, she will teach you how to use it. In some of the stories, Dr. Potts will send you to the cards to find information. But once you know how to use the data base, you can also get to it directly from the *Main Menu*.

To get to the *Grizzly Food Data Cards* from the menu, use the arrows or the mouse, or press a number to move the cursor to *Grizzly Food Data Cards*. Then press RETURN, or use the mouse button. The *Data Card Menu* will appear:

Grizzly Food Data Cards
Data Card Menu
What would you like to do?
1. Look at all data cards
2. Search for words
3. Learn to use the data cards
4. Quit

To choose, use the arrows, the mouse or the numbers, Then press RETURN.

You can browse through the entire list of foods in the data base and choose the name you want, or you can search for cards that contain particular words. You can also either learn to use the data base or leave the data base.

Browsing

To browse through some or all of the data cards, select **1** and press RETURN, or use the mouse button. You will see a list of some grizzly bear food:

Grizzly Food Data Cards

Which card would you like to see?

Ants
Bacon Grease
Beef Cattle
Biscuitroot
Bison, Buffalo
Clovers
Common Chokecherry
Cow-parsnip
Cutthroat Trout
Dandelions
more

To choose, use the arrows, the mouse or the numbers. Then press RETURN.

Move the highlight / cursor down the list of foods. When you get to "**Dandelions**," the list will move up, showing more foods. You can keep moving the cursor down to reveal all of them. When you reach the end of the list, the word "**more**" will disappear.

To look at a data card, move the cursor to highlight the food you want, then press RETURN, or use the mouse button. The *Grizzly Food Data Card* for that plant or animal will appear on the screen.

There is all you need to know about where the plant or animal can be found, what it looks like and when it is most likely to be a food source for grizzlies.

Searching

To search for particular data cards, select **2** on the *Data Card Menu* and press RETURN, or use the mouse button.

To do a search, first define the category of foods that you want to search for. Suppose you want to find all of the foods that the grizzly eats in the summer. You will see the following question:

What word do you want to search for?

Type the word that characterizes the food you want to find. Then press RETURN, or use the mouse button. (In this case, you want to find summer foods, so you would type the word **'summer.'**)

Next you will see a new screen:

Grizzly Food Data Cards

Search for 'summer' in which category?
1. COMMON NAME
2. SCIENTIFIC NAME
3. KINGDOM
4. GROUP
5. HABITAT
6. SEASON
7. NOTES
8. All categories

To choose, use the arrows, the mouse or the numbers. Then press RETURN.

These are the seven headings on each *Grizzly Food Data Card.* You can choose to search for your word in one of these categories, or you can search in **All categories** — the eighth item.

To do a search in one category, highlight the category in which your search word might be found. Then press RETURN, or use the mouse button. (In the example, 'summer' would be found in the category **'SEASON,'** so you might highlight **'SEASON'** and press RETURN, or use the mouse button.) Then you would see a new menu:

Grizzly Food Data Cards
Find every card where 'summer' is in SEASON

1. Do this search
2. Change this search
3. Search for 'summer' AND
4. Search for 'summer' OR

To choose, use the arrows, the mouse or the numbers. Then press RETURN.

To do this search, select **1** and press RETURN, or use the mouse button. You will see a list of all plants and animals that belong to the category you have defined. (In this case, you would see a list of all foods eaten by the grizzly in the summer.)

Highlight the name of the food you want, then press RETURN or use the mouse button to see the *Grizzly Food Data Card* for that food.

To **Change** the search, press **2** and then RETURN, or use the mouse button.

You will go back to the word choice screen, and you may type in a new word and highlight a new category in which to search.

If you want to expand your search, you may choose two characteristics to define the category for your search. In an **AND** search, you search for foods that meet the first and the second characteristics. In an **OR** search, you search for foods that meet either the first or the second characteristic.

AND Searches

Let us continue the example from above. Say you have chosen your first characteristic, 'summer' **SEASON**, and you decide you want to find all foods that a grizzly bear eats in the 'summer' **SEASON** ***AND*** that grow in a 'forest' **HABITAT**. You should create a search using the word **AND**.

To do an **AND** search, select **3** and press RETURN, or use the mouse button. You will see the following screen:

Grizzly Food Data Cards

Find every card where 'summer' is in SEASON AND ...

What other word do you want to search for?

_____

Fill in the blank.
Then press RETURN.

Fill in the second word and highlight the category in which to search for that word. For example, the second word here would be 'forest,' and the category would be **HABITAT**.

After choosing the category, the two words and their categories will appear on the screen. At that point, you can either do the search or change it.

If you do this search, you will get a list of all plants and animals that are eaten in the summer and are found in the forest. This will be a smaller list than the one you would get if you just searched for all summer foods. That is because all summer foods that are not found in the forest will be eliminated from your list.

The rule is: In an **AND** search, each food on the search list must meet **both** of the qualifications you have set.

OR Searches

But, what if you wanted to create a list of foods that a grizzly bear eats either in the summer **or** in the spring? Then you would create a search using the word **OR**.

To do an **OR** search, select **4** and press RETURN, or use the mouse button.

Fill in the information the same way you did in the **AND** search — type the first word and category ('summer,' **SEASON**) and then the second word and category ('spring,' **SEASON**).

The difference is that now you are asking the computer to search for foods that fall into either one of these two groups — summer food or spring food. This list will be longer than in the **AND** search list, because a food only has to fall into one of the categories to be included here.

The rule is: In an **OR** search, each food on the search list needs to meet only **one** of the qualifications you have set.

Story 2: Bear Encounters

You have just been assigned the job of field investigator in a large national park. What is your role? — to investigate incidents where grizzlies and people come in contact. You will be called upon to investigate grizzlies disrupting campgrounds, housing developments, garbage dumps and cattle ranches. You will have to determine how serious the incident was, which bear was involved and what to do about it.

Driving Around the Area

In this story, you will have to drive your pickup truck, as represented on a map. Here are some hints to help you travel around:

Use the arrow keys or a mouse to move the truck graphic around the map. If you are having trouble moving right or left, especially if you are trying to negotiate a bend in the road, move up or down a little, and then try to move right or left again. If you are having trouble moving up or down, move right or left a little and try again. When you get to your destination (make certain that you have driven to the end of the driveway, if there is one), press RETURN, or use the mouse button.

You will need to use a similar technique to drive in *Story 3: Grizzly Bear Mystery.*

Incident Notes

In your investigation during *Story 2: Bear Encounters*, you will need to keep track of a lot of information. Photocopy and use the *Incident Notepad* on the following page to helporganize the facts you uncover.

Incident Notepad

Investigation Information

- What type of incident was it?
- Did the bear injure anyone or act aggressively toward people?
- Was all food properly stored?
- Was the bear fed by people or otherwise provoked in any way?

Identifying the bear:

- Sex
- Size
- Ear Tag
- Radio Collar

Conclusions

- Which bear was involved?
- What type of bear was it?
- How old was the bear?
- How many times had the bear been relocated?
- Which problem type best describes the incident?
- What should be done with the bear?

Story 3: Grizzly Bear Mystery

It is no fun finding a dead grizzly, but that is just the discovery that has been made. As a wildlife student, you are called to the scene. It is your job to figure out what caused the bear's death. Did it die of natural causes, or was it killed by humans? Was it poisoned, or was it shot? And if someone killed it, who did it?

Exploring the Meadow For Clues
To help solve the mystery of the grizzly's death, one of the things you should do is search the meadow at Elmo Creek for any clues. In the *Detective's Notepad* on the next page, record all of the clues that you find.

To search for clues in the meadow, use the arrow keys or a mouse to move the + around the meadow. When the + is at a spot where you want to search, press RETURN or the mouse button. When you are done exploring the meadow for clues, move the + to your pickup truck, and press RETURN or the mouse button.

Performing the Necropsy
You should also perform a necropsy — an examination of the bear's body — for clues. To do this, move the truck to your lab. To examine the outside of the body, use the arrow keys or a mouse to move the + to the part of the bear that you want to examine, and then press RETURN or the mouse button. To examine the bear internally, move the + to a scalpel, and then press RETURN or the mouse button. When you are done performing the necropsy, move the + to the door of your lab, and press RETURN or the mouse button.

Need Some Help?
If you are having trouble solving the mystery, drive to headquarters (HQ in the lower left corner of the map) and ask Officer Jenkins for help.

Detective's Notes
You need to keep track of the clues you find during *Story 3: Grizzly Bear Mystery.* Photocopy and use the *Detective's Notepad* on the next page for help.

Detective's Notepad

- How would you describe the bear when you first saw it?
- About what time did the bear probably die?
- What clues did you find in the meadow?
- What clues did you find on the body of the bear?
- What clues did you find when examining the bear internally?
- How did the bear die?
- What evidence do you have to support that theory?
- Was a weapon involved, and if so, what kind of weapon?

Interviews:

SUSPECT	NOTES	ALIBI
Joseph Bighorn, rancher		
Fred Moon, resort owner		
Sylvia Nimrod, hunter		
Len Smith, photographer		
Malcolm Widener, resort guest		

Solution

What is your solution to the mysterious death of the grizzly bear?

Story 4: Oil Explorer

How will you develop a small work site in a wildlife management area without endangering the balance of the grizzly's habitat? In this story, you work for an oil company, helping to plan a new oil drilling site in grizzly habitat. To succeed at your job, you must find compromise solutions to a number of problems while taking into account environmentalists' concerns, the needs of your company and government regulations. In each mission, you will be given more responsibilities as you are introduced to different features of the *Grizzly Habitat Model.*

Using the Grizzly Habitat Model

Most of your work for the oil company will be using the *Grizzly Habitat Model* to plan for activities such as drilling test sites and building roads. Here are a few hints to help you use the model successfully:

- When planning a new road or a helicopter flight path, the road or path must start at the existing road and end near the drilling site.
- Make the road or flight path as short as possible; always head toward the side of the site that is closest to the existing road.
- To minimize the destruction of grizzly habitat units, avoid the current season's food supplies.
- If you are having trouble choosing a site for any activity, experiment with being just at the edge of the site, rather than actually within it.
- When you are choosing sites for more than one activity (such as drilling a well and setting up a campground), try placing them close together. That way, some of the damage done to the environment will overlap from the two activities, and the total habitat units lost will be reduced.
- If you are having trouble, ask for help from Jim Kemp, Dana Dinmont or Bitsy Baylor. If you ask for help when you are choosing a site for an activity (when the map is on the screen), you will get advice on that specific activity. If you ask for help when the *Activity Summary* is on the screen, you will get more general advice.

Additional Use of the Model

After you learn to use the *Grizzly Habitat Model* in *Story 4: Oil Explorer*, try using the model from the *Main Menu*. The model will allow you to explore and discover the effects on grizzly habitat of timber harvesting, developed campgrounds and resorts.

THE BEAR FACTS: Q & A

PART TWO:
THE BEAR FACTS: Q & A

Meet the Grizzly

What is a grizzly bear?
The North American grizzly bear is the largest meat-eating animal in North America. One type of grizzly, the Alaskan brown bear, can weigh as much as 1,600 pounds. Grizzlies in the lower 48 U.S. states are smaller — they grow up to *only* 1,200 pounds. A grizzly of that size is seven feet tall when it stands on its hind legs.

Grizzlies are covered with a thick coat of brownish fur. They have long, sharp claws, a large hump of muscle between their shoulders and very short tails. They walk flat-footed on the soles of their feet, as people do. This is a sign that bears do not do much running. Swift animals, such as dogs, cats and deer, walk on the tips of their toes. (Bears can, however, move rapidly over a short distance.)

Today, grizzly bears are found in only a few places in the United States. Small groups live in the west in Montana, Wyoming, Idaho and Washington. More grizzlies live in Canada and Alaska. But this mighty animal once roamed over much of North America.

How did the grizzly get its name?

The grizzly got its name because of its fur. The long hairs of its coat sometimes look gray or silver in the sunlight. The word ***grizzled*** means streaked with gray. So European settlers called the bear a grizzly. But the grizzly has had other names. Some settlers called it the horrible bear, and some called it the silvertip bear.

Many animals have more than one name. For example, puma, mountain lion and cougar are all different names for the same animal. This can be confusing, so scientists have agreed on a system that gives each animal just one scientific name. Under this system, the grizzly bear is called ***Ursus arctos horribilis.*** If you want to learn more about scientific names, read the box in the next column.

A NAME FOR EVERY ANIMAL

In the 18th century, a Swedish scientist named Carl von Linne developed a scientific system for naming plants and animals. Until he developed his system, the people of different countries each had their own names for plants and animals. Sometimes animals had more than one name, even within a single country. This caused much confusion. Scientists needed to be sure that they were talking about the same animal.

Linne solved this problem by giving each animal a name in Latin or Greek. The grizzly's scientific name is ***Ursus arctos horribilis.*** The first word, ***Ursus,*** is Latin for bear. All North American bears have Ursus as a first name. This is a **genus** name. A genus is a group of animals that are closely related. For example, the wolf, the coyote and the dog all have the same genus name of ***Canis.***

The next name, ***arctos,*** is the grizzly's species name. Animals in the same species are very similar. The Alaskan brown bear (Kodiak bear), the European brown bear and the grizzly are all members of the same species. They all share the scientific name ***Ursus arctos.***

The grizzly's last name, ***horribilis,*** is a subspecies name. A subspecies is the same thing as a race or a breed. The European brown ***(Ursus arctos arctos)*** has the same genus and species name as the grizzly, but it has a different subspecies name. This shows that the two bears are very closely related.

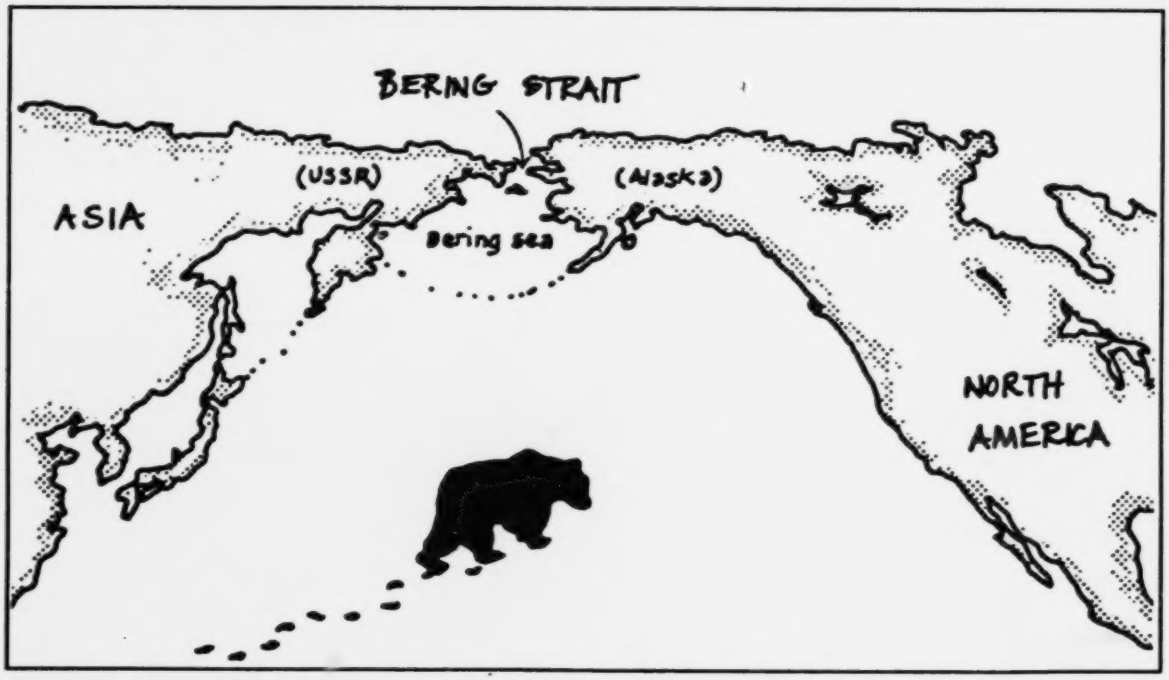
Some Grizzly History

Where did grizzlies first come from?
Look at this map of the Bering Sea and the land around it. You will notice that Alaska and the U.S.S.R. seem to reach toward one another across the Bering Strait. This gap from the New World to the Old is barely more than 50 miles across. The water there is no more than 150 feet deep.

During the earth's ice ages, much of the world's water was frozen in glaciers. The level of the oceans sank so low that the Bering Strait was left high and dry. This left a land bridge — a way for animals from Asia to get to North America. Many animals traveled across the bridge, and one of them was the Old World brown bear. It probably reached North America sometime during the past two million years. That brown bear was the ancestor of the grizzly.

Who are the grizzly's relatives?
For over two million years, the descendants of the Old World brown bear slowly changed or evolved, and the places to which the bear had migrated determined how the bear changed. On the islands of Alaska, bears had plenty of fish and other food to eat, so they evolved to a giant size. They are now called Kodiak or Alaskan brown bears, but they are the same species as the grizzly. They can weigh almost a ton, and they stand nine feet tall on their hind legs.

The grizzly and the European brown bear are still very similar, but they do have different temperaments. The European brown bear is usually shy, while grizzlies are more aggressive, and they will sometimes attack people when they feel threatened. This may be because humans killed many bears in Europe, and only shy bears that stayed away from humans survived. Since their offspring also tended to be shy, after many generations only shy bears remained. In North America, there were fewer humans, so aggressive bears were not killed off. That situation has changed in the last 200 years.



The Land of the Grizzlies

How many grizzlies are there?
Some experts believe that more than 100,000 grizzlies once roamed the western United States. Today, no more than 1,000 remain there. In Alaska and Canada, some 30,000 to 34,000 survive.

Where are they found?
Grizzlies once ranged over much of North America, from Alaska to Mexico, and from the Pacific as far east as the Mississippi River. But today they are found mainly in Alaska and in the wilderness areas of western and northern Canada. Only a very few grizzlies still live south of the Canadian border. The last grizzly areas south of Canada are:

- Yellowstone National Park and nearby areas, where about 200 grizzlies remain.
- Glacier National Park and surrounding areas where about 600 grizzlies remain.
- Cabinet and Yaak mountains, about 2,600 square miles in northwest Montana and northeast Idaho. About six grizzlies live in the Cabinet Mountains. Numbers in the Yaak area are unknown, but bears are seen there every year.
- Groups of grizzlies may remain in parts of Idaho and Washington, but no one knows how many. These groups are separated from one another by wide distances.
- Some grizzlies may still remain in Mexico, but scientists looking for Mexican grizzlies have not found any since the early 1960's.

What happened to the grizzly?
The grizzly started to disappear as the United States expanded into the West. Grizzlies that lived in the prairie and lowland areas of the country disappeared first. They survived much longer in the remote mountains.

The bears' struggle to survive began with the first explorers, who killed bears for protection and for hides. But the real problem for the grizzly did not start until about a hundred years ago. That is when ranchers started raising large herds of cattle and sheep in western states.

Ranchers feared that meat-eating animals, such as the grizzly, mountain lion and wolf, would eat the ranchers' cows and sheep. The ranchers hired trappers to kill off the predators. The trappers used poison as well as traps. But they did not work fast enough to please the ranchers. So the ranchers got the federal government to start a **predator** control program. Predators are animals, such as wolves and bears, that hunt other animals for food. Controlling predators means killing them. In 1915 a federal predator control program was started, and it continues to this day.

The main target of the program was the wolf. To kill wolves, the agents would poison the bodies of dead livestock and leave them where wolves would find them. Bears found them and were poisoned, too. Special bear traps were also put out for grizzlies.

The growth of ranching hurt the grizzly in another way. The sheep and cattle occupied land that bears used to use. There were not enough natural foods to support all of the bears in the land that was left. Starvation began to kill the grizzly, and soon the grizzly began to disappear from the land in which it had lived for hundreds of thousands of years. It was killed off in Texas in about 1890, vanished from California by 1922, from Utah a year later, from Oregon in 1931, New Mexico in 1933, Arizona in 1935 and Colorado in 1979.

Grizzlies Alone and Together

Do grizzlies live in groups?
Grizzlies usually live alone. Food is one thing that brings them together. Grizzlies gather together to eat when there is a lot of food in one small area. For example, grizzlies may gather at garbage dumps, which are a source of food for them. Large numbers of bears will also gather at trout and salmon streams when there are lots of fish moving upstream.

During this time, the larger and older grizzlies will claim the best fishing sites. There are few fights to decide who gets the best spots, since each bear quickly learns who he can boss around and who can boss him around. Older males usually get the choicest spots at the top of the stream.

When do grizzlies mate?
The mating season is the other thing that brings bears together. In most areas, grizzlies mate in May and June, though in Alaska they have been known to mate as late as in August.

During the mating season, males will sometimes fight for the right to mate with a female. Once they mate, the male and female bears stay together for anywhere from a couple of days to six weeks. It seems that if there are many bears in the area, couples break up sooner and mate again. After the mating season, the bears go back to being on their

Grizzly Babies

When are grizzlies born?
Grizzlies are born in January and February in their mother's winter den. The mother is hibernating at that time of year. Most females give birth to two cubs, but it is not unusual for a female to have one or three cubs. Like all mammals, the mother grizzly nurses her cubs, even though she is still asleep. The cubs and their mother stay in the den until spring.

How long do cubs stay with their mothers?
Cubs usually stay with their mothers for two full summers, and they den with her for two full winters. During this time the mother defends them from any dangers that may threaten them. One dangerous threat is the adult male grizzly bear, who may not hesitate to eat cubs. Mother grizzlies are extremely dangerous. They will attack any intruders, including humans, that seem to pose a danger to their cubs.

During the time they spend with their mothers, cubs learn many things. They learn where to look for food, which things make good food and which do not. They learn where to look for winter dens. Unfortunately, they also learn the location of garbage dumps and picnic areas where their mother has found human food in the past.

It seems that cubs also learn how to act toward other grizzlies. If a mother is a dominant bear, one that bosses other females around at gathering sites, such as fishing streams, then her cubs tend to do the same thing when they grow up.

How big do grizzlies get?
At birth, grizzlies weigh only about half a pound. By the time grizzlies in the lower 48 U.S. states are fully grown, adult males may stand seven feet tall on their hind legs. Males range in weight from 300 to 800 pounds, but a really big male might weigh 1,200 pounds. Females range from 150 to 500 pounds. Grizzlies in Alaska can get even larger.

The grizzly is quite large compared to the other big North American predators. The wolf rarely weighs more than 130 pounds, mountain lions rarely more than 200 pounds.

Grizzlies grow quickly for the first two and a half years of life. After the first year, males tend to be larger than females of the same age. Males reach full size at about seven years, females at five.

The grizzly's weight varies throughout the year. It is highest when the animal enters its winter den. At the end of winter, when the bear leaves its den, it will have lost between 5 and 40 percent of its weight. It continues to lose weight until early summer and begins to gain in late summer.

Bears gain weight rapidly in the fall, as much as a pound a day. Young males have been known to triple their weight prior to entering the winter den.

How long do grizzlies live?
Grizzlies in captivity have lived as long as 47 years. In the wild they can live to more than 30. A wild bear in the Cabinet Mountains of Montana is known to be 33 years old.

Grizzly Food

Are grizzlies meat-eaters?
Grizzlies will eat almost anything, but in most places they are not very active hunters, and they eat meat only when it is easy for them to do so. In fact, up to 90 percent of a grizzly's diet may be plants, including leaves, stems and roots.

Like all bears, the grizzly is part of a group of animals called **carnivores**, which means *meat-eating*. Other carnivores include the dog, cat and weasel families. Most carnivores do eat meat, but not all of them. China's giant panda, for example, is a carnivore, but it eats almost nothing but bamboo.

So why are the grizzly and the panda called carnivores? Because they are closely related to the other animals in the carnivore family. Like other carnivores, they have sharp teeth and claws. They are like them in other ways, also. Scientists believe that all carnivores evolved from the same group of animals. Maybe those original carnivores were all meat-eaters. But over millions of years, the grizzly has evolved and changed until today, meat is only a small part of its diet.

What kinds of plants do grizzlies eat?
There are three types of plants that the grizzly eats year-round. They are horsetail, grasses and sedges.

In spring and summer, grizzlies eat cow parsnip, clover and dandelions. In the mountains during summer and fall, grizzlies also eat berries that grow on shrubs. This fruit helps them to put on fat before winter. Pine nuts are an important food in the fall.

Some of the plants the bears eat in the spring are called spring beauty, Wyeth biscuitroot and glacier lilly. In the summer, they also eat salmonberry , common chokecherry and thimbleberry.

What other foods do they eat?
When they can, grizzlies eat large hoofed animals such as deer, elk or caribou. They may kill these animals themselves or feed on dead bodies that they find. However, in some parts of Alaska they frequently kill moose. Rodents such as ground squirrels are also important foods, especially in the spring after the bears come out of their dens.

Trout and salmon are important foods in the summer, when large numbers of fish swim upstream to breed. Believe it or not, the huge grizzly also eats ants and other insects.

One easy place to find food is in garbage dumps. Another place is in towns, where people put garbage in cans near their homes and businesses. Females that feed on human garbage or that look for food in towns may teach this behavior to their cubs. Bears such as these become used to being around humans, and they may become major threats to human life. Bears that seek food in towns and at campgrounds where garbage is not properly stored present one of the biggest problems to those that try to protect and preserve the grizzly.

More information about what grizzlies eat can be found on the *Grizzly Food Data Cards* on your diskette(s).

Hibernation

What is hibernation?
Hibernation is a deep sleep that many animals enter when winter begins. They do not wake again until spring. While an animal hibernates, it does not eat, nor does it defecate. This is one of the biggest benefits of hibernating. During winter, food is scarce, and the hibernating animal avoids starvation by sleeping and living off of stored fat. In addition, while hibernating, the animal's body systems slow down, which means it needs less energy, and it uses up less fat.

When do grizzlies hibernate?
In Canada and Alaska, where winter starts earlier and lasts longer, the bears start hibernating around October and come out of their dens as late as May. In the lower 48 U.S. states, grizzlies usually hibernate from November to April.

Where do they go?
Bears frequently return to the same den area every year, but they rarely use the same den twice. Grizzlies usually dig their own dens, often under trees. They also den in caves and other natural holes. Most dens are in forested areas, but they may also be in clear areas, such as open hillsides. Grizzlies in the lower 48 U.S. states tend to hibernate in areas above 6,500 feet. At that height, deep winter snows bury the dens and insulate the bears from cold.

What happens during hibernation?
When a grizzly hibernates, its heart slows down. When a bear sleeps during the summer, its heart beats 40 to 50 times per minute. But during hibernation, its heart beats only 8 to 12 times per minute. Breathing also slows down. During the winter months, the bear's hearts and lungs get a rest. This saves them a lot of wear and tear. This helps the bears to live longer than other animals that use their bodies at a normal rate year-round.

Grizzlies and People

Are grizzlies dangerous to people?
Grizzlies very seldom attack people. Since 1872, only 45 people have been killed by grizzlies in North America.

When they do attack, it is usually because they have been bothered or threatened in some way. For example, mothers with cubs are very dangerous. They consider any approach to be a threat to their cubs. Grizzlies may also attack either to defend their food or when someone suddenly comes close to them. To be safe, never get close to a grizzly, and never try to feed one.

Do grizzly bears climb trees?
Large, heavy grizzly bears cannot climb high into trees. But smaller grizzlies can climb trees easily. Even big ones can get more than 15 feet above the ground in a sturdy tree. Trees are not a safe place to escape from a grizzly unless you can get at least 20 feet above the ground.

How fast can a grizzly run?
Although grizzlies appear slow and bulky, they can run as fast as a race horse, reaching 30 miles per hour for short distances. Trained human athletes rarely reach as much as 15 miles per hour.

Why should grizzlies not be fed?
If a grizzly becomes used to eating human garbage or human food, it may become dangerous. A bear that makes a habit of visiting towns or campgrounds for food is called a problem bear. Bears that beg food from people or that seek food in garbage cans may also be problem bears.

What happens to problem bears?
Rangers in the national parks use different methods for dealing with problem bears. Sometimes they shoot the bears with rubber bullets that scare but do not harm them. Loud explosions have also been used to frighten bears away from areas used by people. When these methods do not work, problem bears may be trapped and flown to remote areas. However, these grizzlies often hike long distances to return to the areas from which they came. Bears that have caused problems more than once or twice may be sent to a zoo or be killed.

A grizzly that attacks someone for no reason will be killed. However, if it seems that a bear attacked because it was threatened in some way, the park rangers may leave it alone. For example, a photographer in Glacier National Park was killed in 1987 by a female grizzly after he got too close to her cubs. The grizzly tried to move away from the photographer, but he kept getting closer to her. The bear had no record as a problem animal. Park officials decided that she attacked only to defend her cubs from what she thought was a threat.

Studying The Grizzly

What kind of scientist studies grizzlies?
Scientists who study living things are called biologists. Zoologists are biologists who specialize in studying animals. A botanist is someone who mainly studies plants. Of course, a zoologist who studies grizzlies may also study the plants that the bears eat. To keep things simple, we will just use the term biologist to refer to all the scientists who are studying the grizzly.

How do biologists study grizzly bears?
There are many methods biologists can use to study grizzlies. The simplest is called direct observation. That just means watching grizzlies in the wild. Scientists can learn a lot with this method, but it has some drawbacks. Grizzlies can be hard to find, and one scientist can only study a few at a time.

But biologists do not always have to see grizzlies to learn about them. They can also learn a lot by looking at grizzly dens, feeding areas and droppings (also called scat). These items are called grizzly sign. By studying grizzly sign, biologists can learn what grizzlies eat and where grizzlies live at different times of the year. For example, biologists can learn when grizzlies prefer meadows, forests or mountains. Each type of area is called a habitat.

What is a radio collar?
A radio collar holds a tiny radio transmitter that sends out beeping signals. The collars are placed around the neck of a grizzly or some other animal. Biologists can pick up these signals on special radio receivers, and this lets them know where the animal is at all times.

Radio collars allow biologists to study many bears at once. They can keep track of the bears without having to follow them on foot. In this way, biologists can learn how far the bears travel during the year, where they go and how often they get together. Some collars will even transmit the bear's body temperature and heart and breathing rates. Radio collars were invented just 30 years ago.

Scientists have learned more about grizzlies from using collars than from any other research tool. Radio collars are also being used to study many other animals, from snakes to sea otters.

How does the radio collar get on the bear?
To use the collars, biologists trap and drug the bears. The drug makes the bear sleepy for a short time. While it sleeps, it is weighed and measured. A blood sample is taken for study, and the bear is examined to see how healthy it is. The biologists may pull a tooth so they can figure out the bear's age. This is done by cutting the tooth open. Inside are growth rings, just like the rings in a tree trunk. Using a microscope to count the rings, biologists can figure out the age of the grizzly.

After a short time, the drug wears off, and the bear wakes up. The biologists watch from a safe distance to make sure the bear is all right when it wakes up. Collars have been made that will inject the bear with a drug when a biologist sends a signal. This makes recapture of collared bears easy.

People Who Study Grizzlies

Two Craigheads are better than one
It is no surprise that John and Frank Craighead have a lot in common — they are twins. One thing they share is a love of the grizzly bear. Since 1959 these two brothers have been studying the bears, and they have helped to make many discoveries.

When they first started studying grizzlies in Yellowstone, they ran into a big problem right away — it is very hard to see grizzlies at night. John and Frank solved this problem by helping to invent the radio collar, something that is now used to study dozens of animals around the world. Once a collar with a radio transmitter was on a bear, the twins could more easily keep track of the grizzly's movements.

The Craigheads followed bears day and night for over ten years, and they learned many new things about the grizzly. They found out how far the bears travel, what they eat at different times of the year, where they den, how they raise their young and how they die.

Today, John Craighead is still studying grizzlies. He is in charge of a team of scientists who use satellite photos to study grizzly habitat. The team spends months collecting information on plants from an area where grizzlies live. Then they compare that information to information in satellite photos of the same area. Once they have done that, they can use satellite photos to keep track of what happens to the plants in an area. This helps them know how well the grizzlies are doing.

Helping people help bears
Christopher Servheen has a job that brings him into contact with a lot of people — and allows him to help a lot of grizzlies. He is the Grizzly Bear Recovery Coordinator. Chris works for the U.S. Fish and Wildlife Service, and his job is to work with all of the different government agencies that are involved with the grizzly.

One day, Chris might be trying to educate hunters of black bears so fewer grizzlies will be killed by accident. Another day, he might be working with a park in order to close a camping area where too many people are coming into contact with bears. The next day, he might meet with state and local governments to talk about ways of keeping grizzlies out of garbage dumps in small towns.

Bear watch
Richard Knight spends a lot of time watching bears. But unlike most of us, he does not go to a zoo to do his bear-watching. Instead, he goes into the woods to visit grizzlies in their natural home.

Richard heads up the Interagency Grizzly Bear Study Team. The scientists in the team spend most of their time tracking and watching grizzlies in the wild. They watch grizzlies feeding, playing, mating and sleeping. They collect bear droppings and study them to find out what the grizzlies are eating. They also study the plants and trees in the area to find out how changes in the plants affect the grizzlies. Sometimes one of the bears they are studying gets into a conflict with humans. Then the scientists on Richard's team try to find out what led to the conflict and how other problems between bears and people can be stopped.

A home for the grizzly
John Weaver is not a carpenter or a house salesman, but he is in the home business, sort of. John is the Grizzly Bear Habitat Coordinator. His job is to save the grizzly bear's natural home.

On a typical day, John might meet with people from a timber company who want to cut down trees in an area where grizzlies live. John will use a computer model similar to the *Grizzly Habitat Model* on the diskette(s) to find out what effect the logging will have on the bears. Using the computer, John and the logging company can figure out how to cut down the trees in a way that will least hurt the bears. They can decide which time of year is the best for cutting the trees, and they can plan for growing new trees and plants in the area after the logging is done. If they plan carefully, when the logging company is done, the area might be a better home for the grizzlies than when they started.

Wildlife Management

How do scientists help the grizzly?
The information that scientists gather is used to make many decisions that will help the grizzlies to survive. Their research shows how many bears there are, how much room they need and whether their numbers are growing or shrinking. Partly based on this information, the government will decide how the bears can be best protected.

The field of science that tries to protect and save animal populations in the wild is called **wildlife management**. Wildlife management is concerned mainly with animals that can be hunted or fished. It is a type of **applied science**. A biologist may study the grizzly just to learn more about it. But a scientist who is involved in wildlife management will use that information to make changes in the grizzly's habitat.

One of the good examples of the results of wildlife management is the increase in the deer populations in many parts of the country. Wildlife managers help increase deer populations by cutting or burning open areas in forests to permit the growth of the plants that deer eat. The managers also plan hunting seasons to control the harvest of deer, to prevent overpopulation and to keep the deer herd healthy.

Who invented wildlife management?
Wildlife management was born in the beginning of the twentieth century. By that time, many animals such as bison, pronghorn antelope, elk and bighorn sheep had been almost completely wiped out. They had been destroyed by hunting and by the destruction of wilderness as people built farms, ranches and towns.

At about this time, people began to form organizations to protect animals from extinction. For example, in the 1880's Theodore Roosevelt, who later became a U.S. president, helped create the Boone and Crockett Club for the protection of game animals. The National Audubon Society was started at about the same time to help preserve the many types of birds that were being wiped out by hunters. These groups helped to pass U.S. state and federal laws that put limits on hunting.

But early efforts to protect wildlife were aimed almost entirely at such game animals as deer, wild turkey, waterfowl and quail. The aim of U.S. state governments was to protect these animals for sport hunters. They still tried to kill off wolves, mountain lions and other predators that they believed would harm game animals.

How did wildlife management change?
One man that helped change our ideas about wildlife management was Aldo Leopold. Leopold once worked as a forester for the federal government. In 1933, he published a book called *Wildlife Management* which was one of the first books to talk about protecting wild animals.

At first, Leopold was only interested in protecting game animals. He thought predators like wolves and grizzlies should be killed to protect deer. Later, Leopold's ideas began to change. He began to understand that predators were part of the natural balance. If they were wiped out, it would hurt all of the animals in an area. For example, if the wolves in an area were gone, soon there might be too many deer. The deer would die of starvation because there would not be enough plants for them to eat.

By the time Leopold died in 1947, the aim of wildlife management programs had begun to change. Today, wildlife management programs are designed to protect a wide range of fish and wildlife species, not just those which are sought in hunting and fishing.

Grizzly Survival

What is killing the grizzly?
Most grizzlies are killed by humans. For example, from 1975 to 1983, biologists kept track of 111 grizzlies in Yellowstone. Thirty-four of the bears died. Thirty of these deaths were caused by humans.

Grizzlies are killed by people for a number of reasons. Some are shot by ranchers who fear the bears will prey on livestock. Hunters who mistake them for black bears, which may be legally hunted, sometimes shoot them, too. Park rangers kill grizzlies that become problem bears. Poachers — people who kill animals illegally for sport or profit — also kill grizzlies.

Will the grizzly disappear?
Unless we continue to work to protect the grizzly, there will be no more grizzly bears south of Canada. Each grizzly death brings that possibility closer.

Grizzlies reproduce very slowly. Females do not have their first cubs until they are four to seven years old. After that, they usually have cubs only once every three years. This slow birth rate worked well for the grizzly when it was the most powerful animal around. In those days, many of the cubs would have lived long enough to become adults. Most of them would have had more cubs.

But things are different now. For example, in Yellowstone, only about 45 of the 200 bears are females. Each time one is killed by a hunter or poacher, it means fewer cubs will be born. If this goes on long enough, more grizzlies die than are born. This leads to extinction.

What laws protect the grizzly?
Grizzlies are protected from hunting by state laws in Wyoming, Washington and Idaho. Montana does allow some limited hunting of the grizzly bear.

The grizzly's strongest protection comes from the U.S. Endangered Species Act. This law was first passed by Congress in 1966. A new one was passed in 1973. The law lists species of plants and animals that are close to extinction. It also protects the listed species in several ways. For example, it forbids citizens from killing or harming listed species. It also forbids the use of federal money in any activities that will harm a listed species. For example, the federal government may not give money for the building of a dam that will harm a listed fish.

The Act also allows the federal government to spend money on state projects for the protection of listed species. And it requires the government to create plans for the protection of each listed species. Altogether, this law may well be the world's strongest wildlife protection law.

How does a plant or animal get on the protected list?
Anyone may propose that an animal or plant be added to the list of endangered species. In most cases, the U.S. federal Fish and Wildlife Service looks at the evidence and decides if the species deserves listing. Marine species — animals or plants that live in the sea — are handled by the U.S. National Marine Fisheries Service.

The grizzly was listed in 1967 on the earliest version of the law. But not all grizzlies are covered. The government may decide an animal needs protection in some places, but not in others. So grizzlies south of Canada are covered by the Act, but Alaskan grizzlies are not.

Grizzly Recovery

What are the plans for the grizzly?
The U.S. federal government develops a plan for each animal listed under the U.S. Endangered Species Act, including the grizzly. This is called a recovery plan. Each recovery plan includes information about the natural history of the animal, how it became endangered or threatened, and what should be done to protect it.

The grizzly recovery plan was completed in January 1982. Its aim is to keep grizzly populations alive in the areas where they existed in 1975. Of course, the grizzly was wiped out of many areas before 1975, but right now the government does not plan to bring them back to those places. It also does not plan to expand the areas where the bears are now.

Where will grizzlies be found in the future?
The grizzly recovery plan aims to help grizzlies survive in these areas:

1. The goal for the Yellowstone area is 200 to 300 bears. This area includes 9,448 square miles of the Yellowstone National Park and adjacent national forests. Most of it is protected as wilderness under the federal Wilderness Act. This means the land is closed to most development. Right now there are 180 to 220 bears in this area. A big problem they face is the tourists. Over two million visitors flock to Yellowstone each year.

2. The goal for the Northern Continental Divide is 500 to 600 bears. This area is 9,633 square miles along the eastern edge of the Rocky Mountains in northern Montana. About 1,800 square miles is designated wilderness. Another 1,600 square miles are in Glacier National Park. About eight percent is in private ownership. Montana has allowed sport hunting of grizzlies in this area, which federal law surprisingly does not prohibit. The current bear population is 440 to 680 bears.

3. The Cabinet Mountains/Yaak area target number is 70 to 90 bears. This is a smaller area, about 2,612 square miles in northwest Montana and northeast Idaho. Five percent of it is privately owned. There are a small number of bears here, at least a dozen.

4. The Selkirk Mountains area has a goal of 70 to 90 bears. This area is 1,980 square miles in north Idaho, northeastern Washington and British Columbia. Four percent of it is private land. The number of bears is unknown; the bears in this area travel back and forth between the United States and British Columbia, Canada.

5. The North Cascades has no goal set. This area of 7,000 square miles in north-central Washington is probably home to a small number of bears.

6. The Selway/Bitterroot area also has no goal set. This is an area of 5,500 square miles on the Idaho-Montana border. Grizzlies have been reported here every year, but no confirmed sightings have occurred since 1946.

Who is responsible for the grizzly?
Several branches of U.S. state and federal governments are in charge of the safety of the grizzly. The main agency is the U.S. Fish and Wildlife Service. Also in charge of protecting the grizzly are the Forest Service, National Park grizzly habitat in the national forests. In the same way, the National Park Service must be sure that the grizzly is not harmed by anything the park service does in the national parks.

In addition to the federal government, branches of some state governments are also responsible for helping the grizzly survive. These agencies are the Wyoming Game and Fish Department; Montana Department of Fish, Wildlife and Parks; Idaho Fish and Game Department; and Washington Department of Wildlife.

To help all these agencies work together, there is the Interagency Grizzly Bear Committee, usually called the IGBC. The committee is made up of representatives of all the different wildlife agencies. Representatives of local Native American tribes and of two Canadian wildlife agencies are also members.

Protecting the Grizzly

Where is the grizzly safe?
The U.S. Endangered Species Act forbids citizens from harming listed animals such as the grizzly bear. This means that even on private land people may not bother or shoot grizzlies. However, some people continue to shoot grizzlies even though they could go to jail or be forced to pay a fine if they are caught. And the law does permit people to shoot grizzlies in defense of human life. Bears that kill sheep or cattle on private lands may be relocated or killed by federal agents.

What about the national forests?
The national forests are owned and run by the federal government. The law says that the government cannot fund any projects that will harm the grizzly. But the national forests are used for many things besides protecting wildlife. Logging, oil drilling, mining, hunting and camping all take place there. This leads to conflicts, and often the grizzly is the loser.

For example, the Forest Service may lease national forest land to ranchers for the use of cattle and sheep. These ranchers sign contracts promising not to hurt grizzlies that kill their livestock. However, in some areas, grizzlies that attack livestock on national forest land have been relocated or even killed to protect the farm animals. For this reason, some people oppose livestock grazing in the national forests.

Logging also takes place in most national forests. The cutting of trees does not harm bears directly, but it may hurt them in other ways. Roads must be built into remote areas before loggers may cut trees there. Roads built for loggers make it easier for campers and hikers to enter these areas. This makes it more likely that people will bother grizzlies, which may lead to moregrizzly bear deaths. Loggers can restore forests and roads by planting more grizzly foods. But some people wish that loggers would stay out of grizzly habitat .

The Fish and Wildlife Service is supposed to prevent any activities that might harm the bears. But sometimes, lumber companies, ranchers, or oil and gas companies may get the government to allow them to use the national forests even if it might hurt wildlife. Many people feel the national forests are one of the last places where grizzlies and other wildlife are safe and that they should be left alone there.

Are the bears safe in the national parks?
The national parks should give the grizzly the best protection anywhere, since no logging, mining or hunting is ever allowed in the parks. However, even in the parks the grizzly faces many challenges to its survival, particularly in Yellowstone.

Two million people visit Yellowstone each year. More and more of these visitors are hiking and camping in remote areas where they come into conflict with bears. Some campers carelessly leave food and garbage out. Grizzlies that find the food learn to look for food wherever people gather. They become problem bears, and they begin to search out campgrounds. A study of Yellowstone bears has shown that nearly all problem grizzlies have to be killed because of continuing problems with people.

The only way to keep bears from entering places used by humans is to keep garbage and food away from them. If the bears cannot be kept from visiting areas used by humans, the grizzly may slowly disappear in the West, even in the national parks.

Are the national parks big enough for the grizzly?
More and more people believe that the answer is no. One problem is that the national parks are surrounded by lands used for logging, oil and gas drilling, hunting and camping. So the parks become islands of wilderness in a sea of developed lands. The bear populations in the parks become separated from one another. This may lead to inbreeding. As a result, fewer bear cubs are born, and the ones that are born are weaker and less likely to survive.

The problem is growing worse, because the lands within the national parks are being chipped away to

meet human needs. Tourist areas for thousands of visitors have been built on prime grizzly habitat, leaving even less land for the bears.

Some biologists have suggested that not only the national parks but the national forests next to them should be set aside for the grizzlies. This would give the bears more room. But some people want to use these forests for other activities, such as hunting, camping, ranching, logging and mining.

While it is clear that the needs of the grizzly must be balanced with human use of the land, unless we change the way the national parks and forests are used, the grizzly bear may not survive much longer.

CONSERVATION ORGANIZATIONS AND GOVERNMENT AGENCIES WORKING FOR THE GRIZZLY BEAR

National Audubon Society
950 Third Avenue
New York, NY 10022

Defenders of Wildlife
1244 Nineteenth Street NW
Washington, DC 20036

The Wilderness Society
1400 Eye Street NW, Tenth Floor
Washington, DC 20005

Sierra Club
730 Polk Street
San Francisco, CA 94109

The National Wildlife Federation
1412 Sixteenth Street NW
Washington, DC 20036-2266

U.S. Fish and Wildlife Service
Division of Endangered Species and Habitat Conservation
Department of the Interior
18th and C Streets NW
Washington, DC 20240

U.S. Forest Service
P.O. Box 2417
Washington, DC 20013

National Park Service
Interior Building
P.O. Box 37127
Washington, DC 20013-7127

Bureau of Land Management
Department of the Interior
18th and C Streets NW
Washington, DC 20240

Senator _____
U.S. Senate
Washington, DC 20510

Representative _____
U.S. House of Representatives
Washington, DC 20515

Montana Department of Fish, Wildlife, and Parks
1420 East Sixth
Helena, MT 59620

Idaho Fish and Game Department
600 South Walnut/Box 25
Boise, ID 83707

Washington Department of Wildlife
600 N. Capitol Way
Olympia, WA 98504

Wyoming Game and Fish Department
Cheyenne, WY 82002

How You Can Help

What can you do to help the grizzly?
One way to help the grizzly is to write to the people responsible for the bears. Let them know that you want the grizzly to be properly protected. You can do this by writing to your representatives in Congress. Ask them to provide more funds for grizzly conservation work under the Endangered Species Act. You may also write to the U.S. Fish and Wildlife Service to ask for stronger protections for the bear. One thing that would help the bears is better protection of their habitat. It would also help if the government made its goals for the grizzly population stronger.

When you hear that the Forest Service, the Bureau of Land Management or the National Park Service are planning to change grizzly habitat, you should let them know that you want strong protection for the bear. If you live in Idaho, Wyoming, Montana or Washington, you may also write to your state representative and to your state wildlife agency for better grizzly conservation.

You may also help out by joining any of a number of wildlife groups that are working for stronger grizzly bear conservation. These groups include the National Audubon Society, Defenders of Wildlife, The Wilderness Society, the Sierra Club and The National Wildlife Federation. All of these groups are seeking more federal funding for endangered species work and better protection of grizzly habitat. The National Audubon Society also offers rewards for information leading to the conviction of people caught harming grizzlies. The dues you pay when you join these groups helps pay for their efforts to help the grizzly. These organizations also publish magazines that will help keep you informed on a variety of wildlife issues.

If you travel in grizzly country, check the regulations at the local ranger station. Be sure to follow all the rules, so your behavior does not make problems worse for the grizzly.

Can we save the grizzly?
Today, the mighty grizzly is closer than ever to disappearing in most of the United States. But this does not have to happen. We know enough to save the grizzly and protect its habitat. But we have to work fast. We have to let other people know about the threats to the bears, and we have to support efforts to maintain the bear and properly manage its habitat. Can the grizzly survive? The answer is yes — if we all help.

BEYOND THE BEAR FACTS: ACTIVITIES

PART THREE: BEYOND THE BEAR FACTS: ACTIVITIES

Introduction

Audubon Wildlife Adventures: Grizzly Bears teaches by getting us involved in simulations that would be impossible or dangerous for most of us to experience first-hand. In addition, the software promotes basic scientific concepts, including the scientific process. As the software user learns about the grizzly at the computer, concepts are developed that can be generalized to all living creatures. The following activities and processes focus on these concepts as they apply to our everyday lives.

These activities reinforce learning in a variety of curriculum areas, and they are targeted for all ability levels in grades 4-12. Most activities can take place in the classroom, lab settings or on school grounds. All involve cooperative learning, and they promote a positive attitude toward nature and self.

Rationale

Our awareness of the interdependence between humans and the natural world seems to diminish with each passing generation. Urban lifestyles that rely upon technological comforts tend to create the illusion that the human race exists independently of all other species.

We are all faced with dwindling resources, the extinction of some plants and animals, and the destruction of natural ecosystems. Our interrelationships with wildlife and the elements of their environment must be appreciated to prevent a general deterioration of environmental quality.

Every day we make consumer decisions which may have an impact on our environment. Our future well-being depends upon a population aware of the facts, concepts and process skills needed to make responsible decisions.

The software program and the following activities seek to: increase **awareness** by providing information and helping to develop problem-solving and decision-making skills; promote **valuing** —the recognition of both the importance of other species and our responsibility to them — through hands-on experiences; encourage responsible **action** through research, letter-writing and community work, all with the hope of seeing positive results!

The following concepts, as they relate to the grizzly bear, are introduced by the software program. The activities that follow help generalize these concepts by presenting them in new situations, thereby reinforcing what has been learned. Goals and skills covered in the activities are also listed below:

Concepts

- Human impact on the wilderness
- Interdependence
- Habitat
- Evolution/adaptation
- Finite resources

Goals

- Foster a positive attitude toward science
- Encourage rational and creative thinking processes
- Develop manipulative and communication skills
- Increase scientific knowledge

Skills

- Problem-solving skills:
  Observing (with all senses)
  Communicating (written, verbal, cooperative)
  Comparing (using various tools)
  Organizing (data gathering, sequencing, classifying)
  Relating (hypothesizing)
  Inferring (analyzing, generalizing, identifying patterns, synthesizing)
  Applying (making judgements based on findings, acting responsibly according to conclusions, inventing)
- Research skills:
  Using reference materials (seeking out information from different resources)
  Practicing note taking

In the process of developing these skills, students will also increase their vocabulary and gain practice with forms of creative expression, such as drawing, mapping, graphing, inventing and writing.

Enjoy the time spent in these activities. Feel free to adapt them according to your own needs, and most certainly enlist the input of your students! The activities are meant to be only part of an on-going learning process. It is hoped that they will lend some suggestions to inspire future awareness and action.

About the Science Curriculum Guide
The next four pages contain descriptions of the specific skills students develop through using the software and by performing the activities that follow in this classroom guide. While these descriptions of the curriculum skills are taken from the Science Framework for California Public Schools, we have found them to be similar or identical to the curriculum skills emphasized in most states.

You will find the descriptions on the left side of the chart on the next four pages, and on the right side you will find the numbers of the activities in this book that help to develop that skill. Use the chart as a guide to help you incorporate the software and those activities into your classroom.

The numbers corresponding to the activities are as follows:

1. Mapping for Discovery
2. Endangered!
3. Create a School Critter
4. Predator/Prey Match
5. Time Machine
6. Home Away From Home
7. Beary Cooperative
8. Bear Cafe
9. Incident Report
10. Ant Antics
11. Save a Species
12. What's My Ecosystem?
13. Preserving Specimens
14. Does Wildlife Sell Cigarettes?
15. How Many Bears Can Live in the Forest?

Science Curriculum Guide

SCIENCE CURRICULUM AREA	ACTIVITIES
Science, Technology, Individuals, and Society:	
<u>Grades 4 - 6</u>	
Scientists look for patterns in what they observe. They develop hypotheses as possible explanations for the way things are; then they develop ways to test these hypotheses.	1, 2, 5, 6, 10, 14
Men and women of all races and many nations, ethnic groups and cultural backgrounds have made, and continue to make, significant contributions to the advancement of science and technology.	14
Honest and objective reporting of results is essential to successful work in science.	1, 2, 9, 10
The nature of our society is strongly influenced by science and technology.	2
<u>Grades 6 - 9</u>	
Classification systems are developed to help organize information about objects, organisms and events.	13
Unexpected observations often result in new questions for scientific study.	1, 5, 6, 10, 12
Applying science and technology to solving human problems can create other problems. Examples are overpopulation, depletion of soil, pollution and traffic hazards.	2
<u>Grades 9 - 12</u>	
The systematic, cyclical application of science processes is a powerful way of gaining knowledge about nature. However, individual scientists do not always follow a set pattern in applying science processes.	2
Our society has held high expectations for what science and technology can do to solve a variety of problems. Sometimes these expectations have been met, and at other times they have proved to be unrealistic.	1, 2, 5, 11, 12

Biological Science — Cells, Genetics, and Evolution

Grades 4 - 6

Living things have adaptations that enable them to live in their particular habitats.	2, 3, 4, 5, 12
A species is a kind of living thing whose individuals have many similarities and can reproduce their own kind.	2, 13
Variations exist among individuals of a species.	10, 12, 13

Grades 6 - 9

Natural selection is the process through which beneficial changes in characteristics that come about through variation and mutation tend to persist over generations, while harmful characteristics and changes tend to be eliminated.	3, 4

Biological Science — Animals

Grades 4 - 6

Animals have adaptations that enable them to obtain and conserve food, oxygen and water; excrete waste products; move; protect themselves against predators; minimize effects of extreme temperatures; reproduce; etc.	2, 3, 4
Animals depend on plants for food.	7, 8, 11, 12, 15
Proper care of pets and domestic animals and behaviors affecting the welfare of wildlife involve personal responsibility and social policy.	6, 12

Grades 6 - 9

Animals obtain their energy from food in the form of plants, other animals and protists.	7, 8, 11, 12, 15
Diet deficiencies can cause an animal's growth, activity, and reproduction to be impaired and, in extreme cases, cause the animal to die.	2, 6, 11, 12, 15
Animals break down the protein in the plants and animals they eat to form their own proteins.	7, 8, 12, 13, 15
Killing of animals for use by humans in such products as meats, leather or trophies reflects individual and social values.	2, 11, 12, 14

Biological Science — Ecosystems

Grades 4 - 6

All of the individuals of one species that live in a limited area are called a population. Populations can be counted, and their size can be estimated using sampling techniques.	2, 10
Population sizes often vary in cycles related to seasons, reproductive patterns and so forth. Population sizes are subject to limitations imposed by space, food supply, predators and the destruction of habitats by natural disasters or human activity.	3, 4, 5, 11, 12, 15
Populations sometimes die out. When all of the populations of a species die, it becomes extinct.	2, 5
When human activities that affect the environment are evaluated, the affect on other populations needs to be considered along with other costs and benefits.	1, 5, 11, 12
Each species needs a particular physical environment.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11,12, 15
All living things that share a particular environment are called a community.	1, 5, 9, 12
An ecosystem consists of a community of living things interacting with each other and with the physical environment.	1, 2, 5, 6, 12
Food chains and food webs indicate the eating patterns of the members of an ecosystem.	2, 6, 7, 8, 12, 15
Predators are animals (and a few plants) that kill and eat other animals (prey).	3, 4, 8, 12

Grades 6 - 9	
Some animal species live cooperatively in permanent or temporary groups. In some animal species, individuals in a population perform specialized functions (e.g., as in colonies of ants, troops of primates and human societies).	10, 12
Populations may stabilize over a period of time in a balanced ecosystem.	2, 5, 10, 12, 15
Succession is a process in which some ecosystems change over time. As changes occur in the physical features of the system, new species move in, population sizes change, and so forth.	1, 2, 5
Food chains and food webs indicate the flow of energy that maintains an ecosystem.	8, 12
Grades 9 - 12	
Because of the intricate relationships that exist among living things and because of the abiotic features of an ecosystem, a change to one part of the system may have far-reaching consequences to the system that are difficult to predict or control.	1, 2, 5, 12, 15
The human species poses special problems for ecosystems because of the recent rapid increase in human population; depletion of resources; widespread use of technology to alter the environment; widespread manipulation of populations of other species; and pollution of air, water, and land.	2, 5, 11, 12, 14
Land use, pollution, energy use, and application of technology all involve ethical considerations for individuals and society.	5, 12, 14

1. Mapping for Discovery

- **Concept:** forming hypotheses, taking appropriate social action as a result of research findings
- **Goals:** to foster a positive attitude toward one's environment, to encourage rational and creative thinking processes, to develop communication skills
- **Grades:** 4 - 12
- **Subjects:** science, creative arts, social studies, language arts, mathematics
- **Skills:** mapping, observation, writing, communication, analysis, invention, problem-solving, cooperative work
- **Grouping:** pairs, small groups
- **Location:** outdoors & indoors
- **Time:** at least three 45-minute periods
- **Key words:** problem, responsible action, compromise, authority

Description
Students will map the major features of an outdoor site, noting positive features, such as landscaping details, and problem areas, such as waste or threats to living things. They will cooperatively decide on one problem situation to correct as a class project.

Objective
Students will be able to: 1) construct legible maps complete with a reference key, 2) describe patterns as to where life forms appear in particular environments, and 3) identify problem areas in an area (e.g., waste, graffiti).

Background
The stories on the diskette(s) have much to say about the importance of grizzly habitat. In *Story 1: On the Spot with Dr. Potts* and *Story 4: Oil Explorer* on the diskette(s), students gain practice using mapping skills as they learn more about the grizzly's habitat. Schools are "habitats" too. They must support the "wildlife" within their boundaries — students, teachers and administrators! Questions of aesthetics, safety, recreation and shelter must all be addressed for the well-being of teachers and students. In this activity, students use their mapping skills to look at the quality of their own school habitat. As in *Story 4,* they will be asked to develop a plan of action to change their habitat.

Much press has been given to asbestos clean-up, but very little attention has been given to beautification projects. Students are rarely given the power to influence positive changes in their home environments, schools or neighborhoods. Instead, they may affect negative change, such as graffiti and abuse. Involvement and creative interaction with their environment can empower your students with feelings of respect and belonging and a desire to continue responsible action.

Stories 1 and *4* on the diskette(s) use maps to help show the basic habitat for a specific area. In the same way, maps are a useful tool which can help students gather and present information in a clear manner. The construction of a map helps students to slow down and to take a closer look at a particular part of their environment. Through this intense observation, students may notice possible problem areas in need of help.

This activity not only gives students practice with mapping skills, but it encourages them to discover problem areas, to search out the means for bringing about necessary changes and to effect change!

Materials
Graph paper. Drawing materials. Building materials optional.

Procedure
Divide your class into pairs or small groups. Assign each group an area in or near the school, or pick an area of the community to study. Supply each group with the necessary materials for drawing a map. Define the scale and a common key, so the maps can later be combined to show the entire area.

When maps are completed, come back together, and have the class share its findings — life forms, structural considerations and problem areas. The findings may also include recommendations for positive change, such as planting in a barren spot, painting, structural additions, etc.

Then put all the maps together in proper placement, and reevaluate problems and recommendations already mentioned with regard to how they affect the entire area. Explore other options that may have been overlooked when

focusing on only one part of the school or community.

Decide upon one situation that the participants feel would most enhance their well-being if changed, one that can be successfully changed. (You may want to have an alternate plan, in case the first choice proves unfeasible). Consider environmental repercussions, upkeep and lasting effect.

Once the class has agreed upon one project, have them write up a proposal for implementing it, including drawings or relief maps, if applicable. Research the necessary channels for affecting change. If your project is at your school, you will want to contact the principal for monies and approval, and the janitor may be needed for labor support and supplies. Your mayor or other sources in the community should be contacted for projects in your neighborhood.

This proposal can either be divided up among the class members, or it can be done as a group. Choose a representative to present the final plans to the necessary authority figures for approval and to report the decision. Proceed according to plan until the project is successfully completed.

Discuss the process that was involved in this project, how the problem was first identified and then fully understood in relation to the whole, and how responsible solutions were sought out that were acceptable within the social structure.

Extension
Develop map-reading skills by conducting a scavenger hunt using the maps. Give clues according to map features.

Conduct a hypothetical interview with a rock from this area. What was it like 100 years ago? Explore the history of the school or community and, through a rock's "eyes," determine the impact of man's intervention over the years.

Evaluation
Do the students feel their project was a success?

Have the community and parents respond to the outcome of this project.

2. Endangered!

- **Concepts:** human impact on wilderness, habitat, interdependence
- **Goals:** to foster a positive attitude toward nature, to encourage rational and creative thinking processes, to develop research and communication skills, to increase scientific knowledge
- **Grades:** 4 - 12
- **Subjects:** science, language arts, social studies
- **Skills:** research, problem-solving, communication, analysis, reading, discussion, evaluation
- **Grouping:** any
- **Location:** indoors
- **Time:** two 45-minute periods
- **Key words:** extinction, habitat, biomes, resources, endangered, threatened

Description
Students will have an opportunity to clarify their values and to increase their understanding of endangered species through research and participation in a class debate.

Objective
Students will be able to: 1) explain how human population growth and interaction with the environment is related to the extinction of animals, 2) conduct research to determine why a particular animal is endangered, and then report their findings, and 3) clarify their values as they debate the pros and cons of saving endangered species.

Background
The stories on the diskette(s) demonstrate the value of grizzly bears and the threat to their continued existence. In the stories, you saw how human activities, such as ranching and residential development in grizzly habitat, can lead to incidents between bears and people, the death of bears and the loss of bear habitat. In this classroom guide, *Part 2: The Bear Facts: Q & A* also discusses the management and recovery programs aimed at protecting the grizzly. The existence of many other plant and animal species is threatened as well.

As our population expands, human needs for food and finite resources put an increasing strain on various ecosystems. As we alter or destroy habitat, we threaten our fragile relationship with other species. We share the Earth's biomes with five to ten million species of plants and animals, and current estimates are that as many as two hundred thousand of these are threatened or endangered. Species have come and gone naturally as a result of naturally-changing ecological conditions over the two billion years that life has existed on the planet. However, humans have raised this rate of extinction to one hundred times its historical level, mainly through the destruction of habitat.

The U.S. Endangered Species Act of 1973 is charged with preserving plants and animals endangered or threatened with extinction. 756 plants and animals are now listed as threatened or endangered. There are another 2,995 plants and 221 animals thought to be eligible for threatened or endangered status. This legislation has helped to save many species from extinction, and as the U.S. Fish and Wildlife Service so hopefully states, "Endangered means there's still time."

Materials
Photocopies of the *Endangered! — Debate* worksheet on page 70.

Procedure
Discuss these questions with reference to the grizzly bear. Then ask each student to choose another endangered animal and find out:
- Why is the species endangered or threatened?
- What habitat does the species occupy?
- How might its extinction affect other plants and animals in its ecosystem?
- What can be done to help save the species?
- What effect would the efforts to save the species have on people and their activities? Refer to the people and their activities in *Stories 2, 3* and *4* on the diskette(s).

This partial list of endangered, rare and threatened animals and plants may be useful in this activity:

Mammals
Pronghorn antelope
Humpback whale
Island fox
Beaver
Wolverine
Southern sea otter

Birds
Elf owl
Bald eagle
Gilded flicker
California condor
Gila woodpecker
Swainson's hawk

Plants
Western lily
Pacific manzanita
White sedge
Ashland thistle
Threadleaf brodiaea
Trinity buckwheat

More information is at your local library, or write to your State Department of Fish and Game or :

U.S. Fish and Wildlife Service
18th and C Streets NW
Washington, DC 20240

National Audubon Society
950 Third Avenue
New York, NY 10022

Have the students present their research to the class. Initiate a discussion about their findings and their values related to saving endangered species. Should we assume responsibility for preserving habitat for fellow species? How do we balance our demands for resources with the needs of other species?

Give the students the opportunity to clarify their values on this issue in a structured class debate. Divide the class into four groups, and assign one of the following four positions on saving endangered species to each group. Refer to the *Endanged! — Debate* worksheet on page 70 of this classroom guide for an additional copy of these four positions:

A. Programs to save endangered species are not worth the government's expense of time and money, especially since they limit our freedom to use land for other purposes such as logging, mining or residential development.

B. Programs to save some endangered species should be carried out, but they should be low priority in government funding, because we do not need to preserve every species on the planet. Meeting human needs for shelter and growing food is more important.

C. Endangered species should be saved because the genetic resources of a particular plant or animal may be beneficial to humanity as a medicine, food or other resource in the future. One-third of our medicines are obtained directly or indirectly from plants.

D. Government programs should make a strong effort to save all endangered species by preserving critical habitat, regardless of the costs or the limits placed on the freedom to use the land for other purposes. All species have the right to protection. They have aesthetic value, and each species is part of a functioning ecosystem which may break down if that species becomes extinct.

Give each group ample time to research the topic and to formulate their arguments. Set up rules, and conduct the debate. Afterwards, ask each participant what position most closely describes their own point of view.

Extension
Research what is being done at the state level to help prevent the extinction of endangered species.

Explore the idea of cultural forms being endangered, such as native languages and rituals.

Describe one occurrence in which human interaction with the environment is threatening the survival of a species.

Have your students use the *Bear Country Handbook* on the diskette(s) to research and answer the questions on the *On-Line Worksheet* on page 80 of this classroom guide (answer key on page 81).

Evaluation
Describe one occurence in which human interaction with the environment is threatening the survival of a species.

Define *threatened, endangered* and *extinct.*

3. Create a School Critter

- **Concepts:** habitat, human impact on wilderness, evolution
- **Goals:** to foster a positive attitude toward wildlife, to encourage rational and creative thinking processes, to develop research and communication skills, to increase scientific knowledge
- **Grades:** 4 - 12
- **Subjects:** science, art, language arts
- **Skills:** creative expression, writing, analysis, communication
- **Grouping:** individuals or small groups
- **Location:** indoors or outdoors
- **Time:** 45 minutes or longer
- **Key words:** adaptation, camouflage, diversity, interdependence

Description
Students will use their understanding of adaptation to create animals which are specifically designed to live in various parts of the school.

Objective
Students will be able to: 1) identify the importance of adaptation for survival, and 2) explain the value of diversity in nature.

Background
It is fascinating to study the survival capabilities of an animal well adapted to its environment. As you saw in *Story 1: On the Spot with Dr. Potts* on the diskette(s), the grizzly bear is well-adapted to its environment. Its sharp claws and teeth, and its coloring, speed and dietary habits are among the adaptations that have made the grizzly a successful animal.

One must strain to see a caterpillar resting on a leaf of the same color or to notice the figure of a praying mantis with a shape that mimics the twigs among which it lives. These are examples of nature as the perfect inventor, giving otherwise helpless animals protection from being discovered by predators.

Camouflage is one aspect of an animal's adaptation to its habitat. Markings, colorations, shapes and special forms all provide an animal with a better chance of hiding from predators and thus surviving and reproducing. Animals that are well equipped to defend themselves against predators are not as likely to exhibit camouflage qualities.

Students delight in taking on the task of creating inventive creatures, well adapted through camouflage and/or specialized skills, and capable of surviving the many threats specific to their own immediate surrounding.

Materials
Photocopies of the *Create a School Critter — Design Draft* on page 71 of this classroom guide. Drawing paper and colored pencils or crayons. Graphic software program and building materials optional.

Procedure
Students are to design a "critter" adapted specifically to one locale of the immediate environment. Students may work either independently or in groups. Examples of locations for their critters are the following:

- A critter that lives on the outside wall of the school building
- A critter that lives on the school's asphalt playground
- A critter that lives on the school lawn
- A critter that lives in the principal's office
- A critter that lives in the classroom

The specific location chosen will influence what the "critter" will eat, how it will move and what form of protection it will utilize (both physically and behaviorally). Consider these three influences when designing body shape, size, color, amount of hair or protective covering and number and type of sensory organs and appendages.

Examples of food sources for these locations are: spilled gas and oil, gravel, grass, children's litter and insects on the wall. Possible threats in these locations are: lawnmowers, car tires, children running, heat and noise levels.

Threats, food sources and terrain particular to the students' chosen habitats should be defined before they begin to design the school "critters" on paper. Hand out a photocopy of the *Create a School Critter — Design Draft* on page 71 of this classroom guide. Then ask your students to fill out the form before beginning their drawings.

Once the critters have been invented, have the students share their drawings and explain their designs. Discuss any other possible environments that these unique critters might survive in. Have them write a descriptive paragraph about their critter starting with, "I am a (wall climber)...". Display the finished work for all to see! Conclude with a discussion on the value of diversity in nature.

Extension

Have the students build their "critters" using natural debris, vegetables, toothpicks and any other materials on hand. The finished "critters" may then be placed in their "natural surroundings," and a "predator hunt" may take place to see just how well they are adapted!

Have the students study the real critters (birds, insects, etc.) living in the immediate area. Focus on specific adaptations necessary for the critters' survival in their habitats. Photograph, illustrate and/or make a list of these adaptive characteristics. Discuss which animals or birds are well adapted for survival and which are not. The students may discover the spraying of pesticides in the area or local cats threatening the bird population. If undesirable conditions are discovered, start an awareness campaign to educate others about the problem. Write the necessary officials with suggestions for change.

Go on to the next activity, *Predator/Prey Match*.

Evaluation

Choose one animal, and write how it is specifically adapted to its environment.

4. Predator/Prey Match

- **Concepts:** habitat, adaptation
- **Goals:** to foster a positive attitude toward nature, to encourage rational and creative thinking processes, to develop communication skills
- **Grades:** 4 - 12
- **Subjects:** science, creative arts
- **Skills:** invention, creative expression, analysis, problem-solving, drawing, evaluation, discussion
- **Grouping:** pairs
- **Location:** indoors
- **Time:** 45 minutes or more
- **Key Words:** adaptation, habitat, predator, prey

Description
Half of the students will design imaginary creatures with the adaptive capabilities to survive in a particular habitat. The other half of the participants must design predators with special features and/or skills to help them catch the already-designed prey. Students may want to use their critters from the previous exercise, *Create a School Critter*, and invent predators for them instead.

Objective
The participants will be able to: 1) describe how adaptations help animals to survive in their habitats, and 2) compare the adaptive capabilities of predators and prey.

Background
The stories on the diskette(s) portray the grizzly as both predator and prey. The bear is a successful predator, but it remains vulnerable to threats from humans. The unprepared grizzly cannot avoid the relatively recent dangers of poisoning, traps, gunshots and the destruction of its habitat.

Adaptations to habitats meet particular needs for both predators and prey. Unique features of animals in the wild enable them to complete tasks that would otherwise be difficult. Lengthened appendages, keen senses, speed, coloration and markings are some examples of adaptations that enable an animal to find food and to avoid being eaten in the process.

Students are given a chance in this activity to match the unique characteristics of animals to their habitats in order to best meet the animal's survival needs. Can the ultimate creature capable of survival in the wild be designed?

This activity reinforces the concept of the relationship between a habitat and the survival of a species. The grizzly bear is well adapted to a particular wild habitat that it has known through time. This habitat is diminishing, in many cases due to human actions.

In *Story 4: Oil Explorer* on the diskette(s), you used a computer model similar to the one the U.S. Forest Service uses to plan human activities in grizzly habitat. Using the model, you sought to plan activities in times and places that were the least disruptive to the grizzlies using the same area.

An understanding of how the grizzly is adapted to its habitat enables one to make important decisions when *visiting* grizzly terrain — decisions regarding actions that may influence the quality of life for the grizzly bear.

Materials
Drawing materials. Building materials optional.

Procedure
If they will be using the critter designed in the previous activity, *Create a School Critter*, students may work alone. Otherwise, they must work in pairs. If two students will be working together, assign a different habitat to each pair. Students can research characteristics of their habitat together to discover the necessities for survival. Instruct one student in each pair to design an imaginary animal best suited to survive in the habitat assigned to them. They must consider weather, terrain and other animals in the area. Have them choose a name for their prey that best describes its survival capabilities.

Ask the second student to design a predator best suited to capture the imaginary prey. Include special appendages and body features along with skills adapted toward catching their prey (e.g., building webs, etc.). They should also give their creature a name to fit its abilities.

Each pair of children may then share their two

drawings with one another to discuss the adaptive qualities of their creatures, but they should not see other people's drawings at this point. During this sharing, children may choose to make slight changes and/or additions to their drawings to make their predators and prey even better matched.

Collect all predator and prey drawings, and mix them up. Have all of the participants try to discover which are best suited for each other. Were they able to match them accurately? If some matches were made that were not initially intended to be predator/prey matches, discuss the adaptive qualities that were common to both "species."

Have the participants vote on the most invincible prey.

Have the participants vote on the most threatening predator.

Are some predators and some prey adapted to environments other than the one they were designed for?

Do some real animals exist that resemble the imaginary creatures? In what ways?

Extension

Observe or research a real-life predator and its prey. Note the adaptive characteristics that help the animals survive in their habitat.

Observe animals at the zoo, and try to figure out how certain physical traits helped them to survive when they were in their wild habitat. Discuss any new behaviors that may have to be acquired for survival in a zoo habitat.

Design a human best suited to a particular environment (e.g., a city).

Evaluation

Describe the physical characteristics that help humans to survive in a particular habitat. Describe the physical traits that leave us vulnerable to current changes in the quality of our habitat (e.g., unprotected skin and ozone deterioration).

5. Time Machine

- **Concepts:** human impact on the environment, interdependence, habitat
- **Goals:** to foster a positive attitude toward nature, to encourage rational and creative thinking processes, to increase scientific knowledge.
- **Grades:** 4 - 12
- **Subjects:** science, creative arts, language arts
- **Skills:** research, organization, communication, creative expression, reading, writing
- **Grouping:** any
- **Location:** indoors or outdoors
- **Time:** 45 minutes or longer
- **Key words:** impact, urban development, chang

Description
Students will imagine going back in time as they research the history of their school and of the land "under" the school.

Objective
Students will be able to: 1) identify processes involved in building, 2) note the impact of human development on previously-undisturbed land, and 3) develop research skills through many traditional and untraditional channels.

Background
The stories on the *Grizzly Bears* diskette(s) show consequences from various intrusions on wildlife and on the ecosystem. The impact of development with oil drilling can be seen in *Story 4*, and the negative effects of human interaction (ranchers, tourists, business, development) is presented in *Stories 1, 2 and 3.*

Altering land from its natural state for human use has an impact on the balance of life within the ecosystem. The extent of imbalance imposed will depend upon the extent of intrusion as well as the nature of alteration.

With historical insight, we gain the understanding necessary for responsible decision-making in the future. This activity lets students look into past processes involved in erecting their school and the resulting impact of development on the natural environment.

Materials
None

Procedure
Have the students imagine that they have the power to travel back in time — you may want to have a "time machine" prop to spur on their creative thinking. They will use this time machine to explore the concept of urban development and human impact on previously-undisturbed land as they research the history of their school.

They are first to go back to a time when the school was being designed. Conduct a class brainstorming session, with the following questions in discussion: What year did building take place? What occupations were included in the design and building process? How was the building funded? What materials were used to build the school? How many people were involved? What was involved in the building process? How were the building processes different from what they are today? What were the concerns of the time regarding planning, environmental issues and urban expansion?

Such discussion will surely spark interest as some questions are answered and as others are only guessed at. Decide how to divide the class for further research into their school's history. You may want to assign research team names to reinforce the feeling of a time machine (e.g., "Time Travelers," "Time Tourists," etc.). Each team should have one unanswered question to research further.

Direct students to the research options available, or have older students do some detective work on their own. The reference sources will depend mainly upon the age of the school. Public libraries and/or city offices often have historical records (complete with old pictures). Local merchants and long-term residents can provide a wealth of information, and students will develop interview skills as they talk with community members. They may have to reference building manuals and meet with construction workers to identify the building materials used and the building processes involved.

When the research is complete, the information needs to be compiled so that all students have an understanding of the entire building process. Ask each research team to "bring back" a sample from the time the school was first built (e.g., a brick, a rock, a twig, a newspaper clipping, etc.), which, of course, is only a prop to help them present their research to the rest of the class.

Information should be recorded, to serve as an historical reference for the rest of the school. This collection of historical data could also include an architectural drawing of the school (showing materials used), graphs (showing costs and labor) and any other useful pictorial representation of information.

As a lead-in to the next part of this activity, have students discuss what they think the local ecosystem was like prior to the time the school was built. What kind of wildlife was present? Who inhabited the area? How far back in time must you go to find the area uninhabited by humans?

Research unanswered questions about the ecosystem further, until all students have an understanding of the type of ecosystem that existed prior to urban development in the area. You may want to construct a time line with important points in time marked (first settler, first permanent building, first highrise, etc.) and/or draw pictures of the immediate area as it was before any development took place. Again, you will want to record everyone's findings in one place.

Have the students "come forward" to the present time. With the knowledge gained from their "travels," have them take a new look around the school grounds. Identify the wildlife presently in the area, and discuss how they are adapted to the changes that have taken place in their environment. Have new species been introduced into the area? Have any become extinct?

Discuss the development taking place in the neighborhood/city presently. "Travel" into the future, and project the outcome of such development.

Display the collection of research material for the rest of the school to see.

Extension

Leave one area of the school untouched. Note changes over time.

On one school wall, have students paint a mural of the "school" environment as it existed before any development took place.

Evaluation

List five ways urban development in your neighborhood has had an impact on the natural environment.

6. Home Away From Home

- **Concepts:** habitat, human impact on wildlife, interdependence
- **Goals:** to foster a positive attitude toward nature, to encourage rational and creative thinking processes, to develop research and communication skills, to increase scientific knowledge
- **Grades:** 4 - 8
- **Subjects:** mathematics, science, creative arts
- **Skills:** analysis, invention, evaluation, problem- solving, comparing/contrasting, discussion, drawing, writing
- **Grouping:** any
- **Location:** indoors
- **Time:** 45 minutes or longer
- **Key words:** adaptation, habitat, survival needs, captivity

Description
Students will design a model zoo *Home Away From Home* for a grizzly bear.

Objective
Students will be able to: 1) identify the physical necessities for a grizzly bear's well-being, 2) note the inherent differences between keeping an animal in captivity and allowing it to be free, and 3) discuss the implications, both negative and positive, of keeping an animal in captivity.

Background
Students learned from the stories on the diskette(s) and from reading *Part 2: The Bear Facts: Q & A* in this classroom guide, that a grizzly bear's habitat and his or her survival needs are quite different from those of familiar domestic animals in urban settings. When students understand an animal's existence in the wild, they come to realize the many ethical questions and physical considerations of placing a wild animal in captivity.

Zoos enable the public to view wild animals that would otherwise be difficult or dangerous to approach, although they have the negative effect of removing animals from their native environments. Zoos attempt to mimic the animal's natural habitat, both for the interest of the audience and for the well-being of the animal. The more exotic and far-removed the animal is from its climate zone and habitat, the more difficult the task is of designing a zoo living space.

In this activity, students must apply their knowledge of a grizzly's habitat and survival needs to designing a model zoo space for a grizzly bear. They will research the many practical questions involved in maintaining a living environment for a grizzly, including food supplies, temperatures, shelter and maintenance. Behavioral questions must also be addressed, such as providing space, grouping the animals, and allowing the animals to mate and have young.

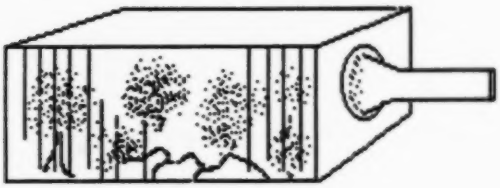
Materials
Photocopies of the *Home Away From Home — Design Draft* on page 72 of this classroom guide. Drawing paper, paints, colorful construction paper, building materials, found objects (pebbles, sticks, leaves), textured fabric, glue, straws, cardboard boxes, graphic design software programs, etc., depending upon the design chosen.

Procedure
Students must have a clear understanding of a zoo plan before beginning actual design work. Have students use the *Home Away From Home — Design Draft* on page 72 to plan their grizzly zoo space. These are basic considerations for a grizzly's well-being away from its natural habitat.

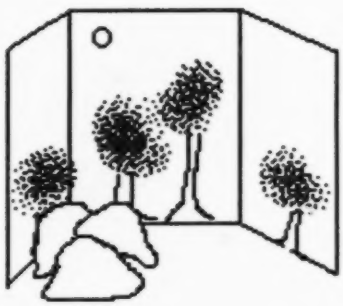
Research materials and techniques for completing the design plan include: library references, writing to zoos for information, arranging for an interview with a zoo caretaker, having a zoo representative come to the class as a role model (students prepare questions beforehand), and/or arranging for a class field trip to a local zoo.

After collecting the necessary information, you may want to discuss your findings as a whole class. The actual design process can be one whole-class project, a few small-group projects or individual endeavors. The design of the "zoo space" can take on many forms, a few of which are listed here:

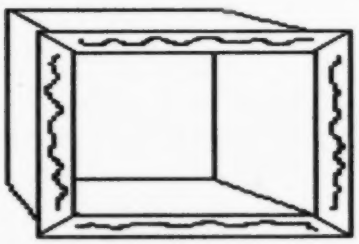
• Diorama — a scene in a box. Use a cardboard box with one side removed. A flashlight may shine through a hole in a side panel for lighting effects. Use found objects (sticks, leaves, pebbles), paint, textured material and construction paper to design the bear's environment.



• Triptych — Figures placed in front of a background made with decorated poster board folded three times. Use glue, construction paper, textured cloth and paint on the backboard. Found objects, paper mache models, fabric sewn into shapes and modeling clay can be used for the shapes in the foreground scene.



• Picture frame scene — same as diorama, except with a frame around the box opening through which people will be viewing the scene. Use same materials as above to construct the scene.



• Free-standing model — Construct a bear zoo scene using the above materials. No specific box or containment, except for the platform on which the scene is built.

• Drawing — can be creative/free hand or architectural in design. A graphic software program can be useful in this design process.

Some careful design should go into making the grizzly bear model/drawing. Refer to *Part One: Operating Instructions* of this classroom guide and to the software program for pictures and information pertaining to the grizzly's appearance.

You can also grow grass from seeds planted in a flat, to serve as a food supply for your "bear" and ground cover for your model. Other helpful model-making materials include: moss and lichens, pipe cleaners, tissue paper, spaghetti noodles and spools to support twigs and cotton balls (for trees).

Display the finished work for all to see and enjoy! Discuss/write about the process of creating this model, the difficulties involved in the actual creative process, and the challenge of creating a liveable environment for a grizzly bear outside of its natural habitat.

Extension
Visit the local zoo, and note recommendations for improvements in quality of life for the animals. Write a letter of suggestions to zoo officials.

What necessities would you include in a cage designed for humans?

Compare a prison cell and a zoo.

Evaluation
Write on your feelings about placing wild animals in captivity.

7. Beary Cooperative

- **Concept:** habitat, seasonal variation
- **Goals:** to encourage rational and creative thinking processes, to develop communication skills, to increase scientific knowledge
- **Grades:** 4 - 12
- **Subjects:** science, social studies, language arts
- **Skills:** communication, analysis, problem-solving, cooperative work, forming hypotheses
- **Grouping:** groups of six
- **Location:** indoors
- **Time:** one 45-minute period
- **Key words:** problem, cooperation

Description
Students will work cooperatively in small groups to find out in which season the "Kamper" family visited Yellowstone Park. To answer this question, they will use clue cards which contain information about the grizzly bear diet and the grizzly bear behaviors associated with each of the four seasons.

Objective
Students will be able to: 1) work cooperatively within a small group to solve the problem at hand, 2) identify a particular season by using clues about the grizzly's diet and habits, and 3) distinguish between information that will lead them to the solution and trivia that is irrelevant to the problem.

Background
Story 1: On the Spot with Dr. Potts on the diskette(s) provides information about the grizzly's diet and specific behavior patterns associated with seasonal changes. It clearly shows how the grizzly diet with the availability of food and changing trends in the weather (especially with hibernation).

Armed with the knowledge of annual changes in the life of a grizzly, students can partake in this lively cooperative activity using clues about seasonal variations, the grizzly diet and certain habits. Their task is to work together to discover the time of year that the "Kampers" visited Yellowstone Park by reading the clues on their specific cards.

In this activity, cooperation is as important as getting the right answer. It would be fairly easy to guess at one of the four seasons, so students must be able to reference the particular clues which support their answer. Since clues may only be **read** (nopt shown) to one other, students must listen carefully to the other group members and maximize their organizational and recording skills, so they can agree on an answer.

Materials
One photocopy of the *Beary Cooperative Cards* on page 73 for each group of six (may be copied onto card stock).

Procedure
For this activity, the class will be divided into groups of six students. As preparation, make one photocopy of the *Beary Cooperative Cards* page for each group of students (card stock is more durable, but not necessary). Cut the photocopies along the dotted lines so you have a set of six cards from each page. One set of cards goes to each group of students — each student will get one card to read, unless you have a slightly smaller group, in which case some student(s) would get more cards.

There are two approaches to beginning cooperative activities: 1) jump right in without much introduction, and then discuss the group dynamics after the activity is over; 2) discuss cooperative problem-solving strategies before dividing the class into small groups. Your class may even have experience with cooperative interaction, in which case, less mention would be made on cooperation and more on the conceptual learning at hand. Choose whatever method will work best for your group.

You may want to address some of the following questions: What is effective communication? When solving a problem, is listening as important as talking? Are two heads better than one? How about six heads? What complications may exist in a group of six students trying to solve one problem, as opposed to an individual working alone? What is the advantage of cooperative problem-solving?

Have the students get into their groups of six, preferably around large tables. Slightly smaller groups will also work — some students will just

have extra cards to read. Tell the students that they will each have two clues with which to help their group answer a question that is written on *Card #1.* Students may read aloud what is written on their own cards, but they cannot show their cards to anyone else in the group. Their task will be to identify the season that the "Kamper" family visited Yellowstone Park.

You may want to mention that not all of the information given is relevant to the problem at hand, or you may want them to find this out on their own.

Place a set of *Beary Cooperative Cards* face down at each table. When you are ready to begin, have each student take a card. Starting with the card marked *Card #1,* have each student read his or her card aloud to the group.

Since there are only four possible answers (spring, summer, fall and winter), ask each group to list or write down the clues which led them to believe that a particular season is the answer. They must have the season written down (so other groups don't hear the answer), and they must have substantial information to back up their conclusion before they may ask the teacher to check for accuracy.

Group members should raise their hands when they think they have found the answer and when they have the support information written down. If, after you check their list, you find some guesswork involved (sketchy work with clues missing), they must gather more support information. Provide a short activity (cooperative art/writing/poetry project) for groups that have solved the problem, so they will have something to do while others are finishing this activity.

The answer is **summer**. Clues which support the correct answer are the following:

- Grizzly cubs are born in January, and a bear was spotted in the park with an seven-month-old cub (the birth month can be identified from the information given on the gestation period)
- Bears were seen gathering around a stream (bears group during feeding and mating times), and salmon spawn in summer months

Clues which *alone* do **not** support the correct answer:

- A bear eating from a berry shrub may imply summer **or** fall
- A bear gaining weight may be preparing for hibernation, which could be summer **or** fall
- Bears eat grass year-round
- Bears eat berries in summer **and** fall

Have the class come together as a whole, and discuss the dynamics of their group working together. Was there a student who assumed the role of leader? Did some people participate less? Did they feel comfortable working in a cooperative situation? Would they rather work alone?

Extension

Bear Squares crossword puzzles: On pages 84 and 85 of this classroom guide, you will find two crossword puzzles. Make photocopies of the puzzles, and have your students complete them. This activity will help students become more familiar with the vocabulary introduced by the stories on the diskette(s).

Have students make up their own set of clue cards for another cooperative group activity about grizzly bears. They may choose any question to solve, as long as they provide the necessary information on the clue cards to find the answer. They may refer to the the *Grizzly Food Data Cards* and the *Bear Country Handbook* on the diskette(s), or they may use *Part Two: The Bear Facts: Q & A* section of this classroom guide. Have groups trade cards and cooperatively take on their classmates' challenge!

Evaluation

Name two summer food sources for the grizzly bear.

8. Bear Cafe

- **Concepts:** interdependence, habitat
- **Goals:** to encourage rational and creative thinking processes, to develop manipulative and communication skills, to increase scientific knowledge
- **Grades:** 4 - 12
- **Subjects:** science, creative arts, language arts
- **Skills:** research, organization, communication, creative expression, reading, writing
- **Grouping:** any
- **Location:** indoors
- **Time:** 45 minutes or longer
- **Key words:** survival needs, carnivore, omnivore, habitat

Description
Students will design a menu for grizzly bears visiting *Bear Cafe.*

Objective
Students will be able to: 1) identify the main plants and animal sources of a grizzly diet, 2) recognize various food types through seasonal changes, and 3) define carnivore.

Background
Most people can get speciality foods that are out of season (and have been frozen or preserved) or from an distant place. Supermarkets, fast food restaurants and the food industry in general offer a wide variety of food types. Our diet is no longer characteristic of our immediate environment, our cultural heritage or the time of year. Under these circumstances, it is easy to lose sight of the strict food web which exists in the wild.

In learning about the grizzly bear diet in *Story 1: On the Spot with Dr. Potts* on the diskette(s), students become acquainted with other wildlife in the area, seasonal changes, bear habits and the fragile balance that exists between living things in a wild environment. They may also be surprised to discover that a large grizzly bear can survive mainly on the vegetation in his home range.

Bear Cafe is a restaurant that specializes only in authentic grizzly grub! Since it is a student-run cafe, they must have a good understanding of the grizzly diet to put together a tasty menu. Even though hungry bears may eat anything, they are very particular when dining out! You wouldn't want to serve up unhealthy or out-of-season food at *Bear Cafe!*

Materials
Photocopies of the *Bear Cafe Menu* worksheet on page 74, a graphics software program, art supplies (optional).

Procedure
This activity may be: 1) a class project, resulting in one extensive grizzly menu, 2) a group research project, with many menus completed by small groups, 3) individual research projects, with each student completing his or her own menu. Whichever the case, research into the grizzly bear diet and habitat must precede the design of the grizzly menu.

For one reference, see page 19 *(Grizzly Food)* of this classroom guide. Note that 90% of a grizzly's diet may be plants (leaves, stems and roots), and that they eat meat only when it is easy for them to do so. There are year-round plants that the grizzly eats (horsetail, grasses and sedges), as well as plants and plant parts specific to each season. The most common animals that grizzly's feed on are also listed. For additional information on the grizzly diet, refer to the *Grizzly Food Data Cards* in *Story 1: On the Spot with Dr. Potts* on the diskette(s).

Discuss the definition of omnivore and talk about the variations within the omnivore family. What conditions might effect changes in an animal's diet?

With a good understanding of the grizzly diet, students can begin to design their *Bear Cafe Menu.* You may want to collect some old menus from restaurants to get ideas for layout.

One possible organization is to list food by season. How might food quantities differ from season to season? Why? What food would be listed for the winter months? Make sure food availability matches the correct season. You may want to include a baby bear menu as well — what food source would be listed?

Another organizational option is to include

appetizer, entre and dessert sections. In this case, students may want to use the *Bear Cafe Menu* worksheet on page 74 which is set up in this fashion.

Be sure to emphasize a play on words when students are thinking up their "dishes." They will have a lot of fun creating concoctions from a wild food supply, such as cow parsnip stew, marinated moose and Auntie Jane's Stuffed Clover Leaves. They can also elaborate on the ingredients with a tasty description of each "dish."

Display the menus for all to see!

Extension
Design menus for other animals (e.g., animals in the grizzly habitat, outside of the grizzly habitat, etc.)

Design a menu for the class, serving only food in season and grown only in the immediate area. Is it possible?

Evaluation
Have students write about the impact of removing various food supplies from the grizzly habitat. For example: sedges, cow parsnips, rodents, etc.

9. Incident Report

- **Concepts:** human impact on the environment, management, scientific process
- **Goals:** to encourage rational and creative thinking processes, to develop communication skills
- **Grades:** 4 - 12
- **Subjects:** language arts, social studies, science
- **Skills:** creative expression, analysis, problem-solving, evaluation, discussion
- **Grouping:** whole class
- **Location:** indoors
- **Time:** 45 minutes or more
- **Key words:** consequences, responsibility, incident, management, protocol

Description
Students will gain practice with interviewing, collecting data and forming conclusions, as they take on the responsibility of classroom management.

Objective
Students will be able to: 1) write protocol, 2) construct *Incident Report Forms*, complete with management guidelines for specific conditions, and 3) take responsible action.

Background
Classroom management often interrupts the normal routine of learning. The more students are involved in determining management policy, the more effective the process is. Why not integrate this tedious task into the students' daily learning experience by involving them in the discipline act?

In this activity, the students and the teacher will outline common incidents which interrupt class time and thus interfere with learning. They will develop management guidelines and determine fair consequences for specific actions.

This activity follows the format of *Story 2: Bear Encounters* on the diskette(s), giving students a chance to investigate a problem and determine outcomes in the same manner as a wildlife investigator researching a bear problem.

Materials
Photocopies of the *Incident Report Form* on page 75 of this classroom guide. Tape recorder optional.

Procedure
Have all students work with *Story 2: Bear Encounters* on the diskette(s) as preparation for this activity. Note the format of the on-line *Incident Report Form* used.

Discuss the systematic process that wildlife biologists follow when making bear management decisions. Who decided what the the guidelines would be? What previous bear actions may have been taken into consideration when determining the guidelines? Of what benefit is a standard questioning format and an accepted list of consequences with regard to bear behavior? What drawbacks, if any, may result from such a policy?

Discuss the value of having a set of predetermined management guidelines for specific class disturbances (some teacher- or school-instigated guidelines may already be set, but they may be unclear to students). You may want to discuss consistency, fairness and where responsibility rests. Past outbreaks may be referenced.

As a group, decide on common class "Situations" that disrupt learning. Make a list during this brainstorming session. If necessary, narrow this list down to the most common disturbances. For this activity to be worthwhile, the list must include problems addressed fairly often. This list may include: tardiness, unfinished work, aggressive behavior, poor attitude, etc. Discuss the extent of the disruption for each incident; for example, does it interfere with the learning of the individual only, of a few class members or of the whole class?

Photocopy one *Incident Report Form* on page 75 of this classroom guide for each incident. The class may be divided into groups (one *Incident Report Form* per group), or "secretaries" may be assigned to record the information on the form as the whole class works together.

Describe one of the "Situations" that you decided upon during the brainstorming session in the top box on one *Incident Report Form* (e.g., student passes a personal note during class time). Decide what information needs to be collected regarding the situation for fair management procedures to be

followed. Write "Questions" on the next part of the form to collect the necessary information. They should be able to be answered with a "yes" or a "no." Sample questions are: "Repeat offender?"; "Was the whole class disrupted?"; "Was the offender provoked?"; "Was anyone hurt?"

These forms should be as short or as long as needed for gathering the pertinent data, but it should take as little time as possible to collect the information. If the situation involves identifying the offender, include questions about his or her description and characteristics.

At the bottom of the *Incident Report Form*, list all possible "Conditions" for this situation. "Conditions" are identified from the previously-answered questions. For example, "Conditions" may be directly related to a specific question, or they may involve a combination of questions:

- *Question*: Was there injury?
  Condition: Injury
- *Question*: Repeat offender?
  Question: Whole class disrupted?
  Condition: Repeat offender disrupted whole class

Next, the group must decide on fair management guidelines for each condition. Since this is a group process, a consensus must be reached, so research, discussion and/or voting may precede a final decision. Write the "Action" to be taken in the "Action" box for each "Condition."

This process may take time initially, but once they are involved, students will understand the consequences of their actions, and they may even become directly involved in the disciplining process. The actual filing of a *Form* may take place as a whole group activity or with one student responsible each day/week. You may want to keep a tape recorder on hand for filing the *Incident Report Form*.

These forms can also act as a record-keeping system for the behavioral status of students. Student histories can be maintained and referred to during parent/teacher meetings.

Extension
Have students research one aspect of another management process (e.g., the legal system) and write on the fairness and/or effectiveness of enforcing a particular law.

Can Find word search: Make photocopies of pages 86 - 87 of this classroom guide, where you will find a word search puzzlewhich will reinforce your students' knowledge of wildlife management.

Evaluation
Have students write a follow-up report on the effectiveness of this management process after it has been in use for a period of time (2 - 4 weeks). They should include suggestions for improvements or changes, if necessary.

10. Ant Antics

- **Concept:** habitat, adaptation, interdependence
- **Goals:** to encourage rational and creative thinking processes, to increase scientific knowledge
- **Grades:** 4 - 12
- **Subjects:** science, language arts
- **Skills:** observing, comparing, organizing, relating, inferring, applying
- **Grouping:** small groups
- **Location:** outdoors & indoors
- **Time:** 1 hour
- **Key words:** colony, queen, worker, drone, egg, larva, pupa, adult, mandible, antennae, crop, thorax

Description
Students will observe and describe the behavior of ants, both in the ants' natural habitat and in a student-made environment.

Objective
Students will be able to: 1) identify the food-gathering and locomotion characteristics of ants, 2) measure the relative speeds of ants and the distances traveled by ants, and 3) compare the cooperative functioning of an ant colony to the way in which communities of people interact.

Background
The stories on the diskette(s) give us an extensive look into the life of a wildlife biologist. Techniques for studying grizzly bears, and policy-making and management processes developed out of the biologist's studies are shown. Students have a chance to pretend to participate in wildlife studies in the interactive simulations of *Grizzly Bears.*

This activity gives students a chance to study, in the insect's natural habitat, wildlife that is a bit smaller than the grizzly. Ants are fascinating creatures. They are social insects living cooperatively in colonies. Studying their interactions helps students to see the similarities between social insect colonies and communities of people.

Ant colonies can be located near most school sites, and ant colonies are easy to observe without disturbing the ants' normal activities. Refer to the *Ant Background Information* on the next page for interesting information that will assist you in arousing your students' interest about this familiar urban neighbor.

Materials
Photocopies of the *Ant Background Information* on the next page, photocopies of the *Ant Antics Worksheet* on page 76 of this classroom guide, stopwatch, ruler, writing surfaces, and small amounts of cheese, bread and honey.

Procedure
Before taking your students out for this activity, you may want to locate some ant hills in the area around your school. Do this the day before you plan to take your class out, and then place a small dish of honey or sugar water out near the ant hill. When your students go out to investigate, they can observe the ants' trails to the food.

Provide students with photocopies of the *Ant Antics Worksheet* on page 76 of this classroom guide to use for making field notes. Also, you may want to give them photocopies of the *Ant Background Information* on the next page; or use this opportunity to have students research the behavioral and physical characteristics of ants on their own.

When you take your class outside, have them work in groups to observe ant behavior around the colonies. If you have located only one colony, have some students observing the colony, while others look for additional colonies. Give students the necessary materials to complete their worksheet. They may want additional paper for notes and drawings.

Discuss the findings. Graph the relative speeds and distances traveled by ants. Look at ants as part of the whole ecosystem — Which mammals depend upon ants as a food source? What other interdependencies exist? Encourage students to appreciate the functioning of the colony as a whole, and compare this to the cooperative interactions which occur among communities of people.

Extension
Build an ant farm in the classroom. After it is well established, introduce ants from another colony and observe.

Write a poem (haiku, cinquain) about ants.

Have students use the *Grizzly Food Data Cards* on the diskette(s) to find answers to the questions on the *Data Card Search* student worksheet on page 82 of this classroom guide (answers on page 83).

Evaluation
What techniques, organizational skills and observational processes are important to wildlife biologists in the field?

Ant Background Information

Colony: The ant colony is composed of a queen, female workers, winged females and a few winged male drones. The queen and the winged ants are the royalty of the colony. They are tended by the workers who forage for food and care for the eggs the queen lays. A colony begins when the male and female winged ants take to the air. On this swarming day, they mate, the males die, and the new queens go off to begin a new colony. The new queen bites off her wings, seeks shelter underground, and never goes above ground again.

She then begins laying eggs for a new colony. Ants have four stages of development — egg, larva, pupa and adult. The worker ants move the queen's eggs to "nursery" areas in the colony. They will also move the eggs near the surface of the ground when days are warm. During cool nights, the eggs are brought down to deeper, warmer rooms. The workers feed the larvae when the eggs hatch. In the pupal stage, the ants do not feed. The young ants are carefully protected by the worker ants. The worker ants will risk their lives to save the young ants.

Body parts of the ant: The ant's head has a small brain and compound eyes. The jaws or mandibles are powerful and are used to cut up food and carry nest materials. The antennae of the ant are used for communication with other ants, and to taste and to feel different objects. If the ant loses its antennae, it soon dies. When the ant finds food, it leaves a chemical odor trail back to the nest, so others can find it. Each ant colony has its own distinct odor which keeps other ants from confusing trails. When ants are moving along, tapping their antennae like a cane, they are following odor trails.

Thorax: The chest section of the ant has salivary glands for food digestion and a small heart. The six legs are connected here. They have no veins, their colorless blood being pumped freely through their hollow body sections.

Abdomen: The ant has two stomachs, the larger being the crop where food is stored for the benefit of other ants. Food needed by the ant is pumped out of the crop to the second stomach where it is digested. When workers return with crops full of food, they pump some from their crop for young ants and the queen. Not having lungs, they breath through special holes in the sides of their abdomens.

11. Save a Species

- **Concepts:** human impact on the environment
- **Goals:** to foster a positive attitude toward nature, to encourage rational and creative thinking processes, to develop research and communication skills, to increase scientific knowledge
- **Grades:** 4 - 12
- **Subjects:** science, language arts, creative arts
- **Skills:** creative expression, research, communication, writing
- **Grouping:** any
- **Location:** indoors
- **Time:** 45 minutes or longer
- **Key words:** endangered, extinction, threatened, campaign

Description
Students will get involved in a campaign to save an endangered species as they work through creative channels to increase public awareness.

Objective
Students will be able to: 1) identify the importance of an endangered species in human lives, 2) research the causes of extinction, and 3) make a creative project with a message for the public.

Background
Endangered is a name given to a species which is close to extinction. Although extinction has been part of the natural evolutionary process for hundreds of millions of years, the current rate of extinction far exceeds any since the mass extinction of the dinosaurs.

This rise in the number of endangered and extinct species can be linked directly to the increase in the human population. We compete with other living things for limited space, and we use valuable habitats to gain resources. Pollution and other problems threatening our own health also threaten wildlife.

As we recognize the important roles that other species play in our lives, it is hoped that we will seek out solutions aimed at protecting wild environments. The diversity of life on Earth provides us with valuable medicines, fibers, paper, plastics and other products. Plants and animals give us an environment capable of supporting life, complete with oxygen, clean water and useable soil. Endangered species have also been the point of inspiration for artists, musicians, writers and daydreamers.

As students learn about endangered species, they better appreciate the reasons for saving the species from extinction. The stories on the diskette(s) give the students a valuable look into the life of one endangered species. The grizzly's problems of habitat destruction and competion for space are the problems facing endangered species worldwide.

Materials
Art materials needed to complete projects.

Procedure
This activity requires initial research into the plight of an endangered species. Each student may research a different species, or the class may join in a campaign for one species in particular (the grizzly bear?). If a suggestion for an endangered species to research is needed, see the activity, ***Endangered!***, on page 40 of this classroom guide.

Have students consider the following two points in their research:
- How has the endangered animal been important to people in the past (e.g., as a food source, for clothing, transportation, pet or as a sign of beauty)?
- How has the endangered animal influenced people in the past(e.g., in works of art, in music and in literature)?

Next, students need to understand why the animal is threatened with extinction. The main causes of extinction include: shrinking habitat from development and/or destruction, hunting, poaching, poisons, pesticides and/or the introduction of non-native animals into the endangered animal's environment.

With this knowledge, students can decide upon the format in which to present the issue of the endangered animal's plight to the public. Students can use information from their research to construct the text of their message. The creative format may take on one of the following styles:

- Greeting card
- Poster
- Bumper sticker
- Public Service Announcement
- Button
- Song
- Poem (cinquain or haiku)
- Book

Each mode of getting the message out will require different planning strategies. Students may choose to show the aesthetic importance of coexistence with this animal, or they may want to point out other important roles that this animal has played in human lives.

Most important, let students feel empowered with this activity, knowing that they can have a positive influence on people's thinking.

Extension
Have students interview a sampling of the audience they reached with their creative project to find out the impact of their work. Were positive changes brought about?

Evaluation
Name one way in which an endangered animal has been important to people or has influenced people.

12. What's My Ecosystem?

- **Concepts:** habitat, interdependence
- **Goals:** to encourage rational and creative thinking processes, to develop communication skills, to increase scientific knowledge
- **Grades:** 4 - 12
- **Subjects:** science, language arts
- **Skills:** communication, analysis, research, cooperative work, forming hypotheses, organization, application of findings
- **Grouping:** individuals or small groups
- **Location:** indoors
- **Time:** one 45-minute period
- **Key words:** ecosystem, habitat, producer, consumer, herbivore, carnivore, decomposer, food chain, interdependent

Description
In this investigation, students will select an ecosystem and conduct research into the composition and interdependencies within it. Then they will have an opportunity to exhibit their knowledge in the process of a game entitled, *What's My Ecosystem?*

Objective
Students will be able to: 1) select an ecosystem and research the nature of interdependence between its components, 2) describe the similarities found in all ecosystems, and 3) describe how human activity can affect the functioning of ecosystems.

Background
The stories on the *Grizzly Bears* diskette(s) give students an opportunity to learn much about the grizzly habitat. The grizzly's physical environment is shown in *Story 1*, including an in-depth look at the grizzly's dependency on various species of plants and animals for survival. The student gains an understanding of one carnivore's diet while studying the grizzly.

Stories 2, 3 and 4 on the diskette(s) show how humans fit into the grizzly ecosystem. The impact of human activity is seen through development and interference in the balance of a particular ecosystem.

This activity gives students a chance to take this learning a step further. They will study the physical environments of other ecosystems and look at interdependencies within food chains. They will also study the impact of human activity on the various ecosystems.

The specific learning that takes place while using the *Grizzly Bears* diskette(s) is reinforced in this fun activity, as that knowledge is generalized into a complete picture of the interdependencies among species, including humans and the rest of wildlife.

Materials
Photocopies of the *What's My Ecosystem? Worksheet* provided on page 77 of this classroom guide.

Procedure
Review the concept of an ecosystem, and ask students to generate a list of different kinds of ecosystems. Ecosystems may range in size from the immensity of planet Earth to a mini-ecosystem found in a terrarium. More obvious ecosystems are forests, deserts, lakes, rivers and grasslands. Less obvious are the ecosystems found in soil, in rotting logs or in the city.

Ask students to decide on an ecosystem that they would like to investigate. Ask them to keep their selections a secret, so that their fellow classmates will be challenged during the *What's My Ecosystem* demonstration. Make and distribute photocopies of the student worksheet on page 77 of this classroom guide, *What's My Ecosystem?*, which provides questions that will help to direct the students' investigations. They can use this worksheet as they conduct research in the library or elsewhere.

When your students have completed their research, they are ready to play the game *What's My Ecosystem?* This guessing game can be played either with individual students answering questions about their ecosystem, or with a panel of students representing the same ecosystem and answering questions together. The student(s) sit in front of the class while classmates ask questions about the ecosystem. These questions must be answerable with either "yes," "no" or "maybe."

To make the game more challenging, limit the number of questions that may be asked about each

ecosystem. The class must then carefully formulate questions as they attempt to identify the ecosystem.

When the ecosystem has been correctly identified, ask the student(s) to describe how humans fit into the ecosystem studied. In addition to our role as consumers, we have had a tremendous impact on a variety of ecosystems. We have exerted our influence through mining, harvesting trees, taking food from the sea, and through actions which have polluted air and water.

Continue the game with a new ecosystem to guess. When all ecosystems have been correctly identified, conclude with a discussion about the similarities found in all of the ecosystems studied. Namely, all ecosystems have an input of energy. All ecosystems involve interdependence between plants, animals and their environment, and nutrients are cycled in all ecosystems.

Extension
Play the game by grouping the students representing the same ecosystems. Each group will go before the class and answer questions regarding their ecosystems. The class then tries to identify the various ecosystems represented.

Have students design a space capsule as a mini-ecosystem which fulfills their basic needs and which recycles all raw materials essential for life. The hypothetical space capsule should be a closed system, requiring only an input of energy. How does planet Earth compare to the space capsule?

Evaluation
Describe how one human activity has had an impact on an ecosystem.

13. Preserving Specimens

- **Concepts:** habitat, interdependence
- **Goals:** to foster a positive attitude toward nature, to encourage creative thinking processes, to increase scientific knowledge
- **Grades:** 4 - 12
- **Subjects:** science, language arts, creative arts
- **Skills:** organization, creative expression, research, communication, writing
- **Grouping:** any
- **Location:** outdoors and indoors
- **Time:** 45 minutes or longer
- **Key words:** classification, organization, genus, species, kingdom, habitat, interdependence

Description
Students will collect and identify local wildflowers, leaves or ferns, and they will make *Wildlife Data Cards*, complete with important information about their specimens for future reference.

Objective
Students will be able to: 1) collect and prepare pressed wildflowers, leaves or ferns, 2) identify the specimen by common and scientific names, and 3) give important background data on the collected specimens.

Background
Students gain practice with classifying plants and animals as they study the *Grizzly Food Data Cards* on the diskette(s). They learn information about grizzly food sources, including appearance, scientific name, common name and habitat. In searching through the *Data Cards*, students can appreciate that the classification system is a valuable tool for organizing information.

This activity gives students additional experience with classifying plants. They will collect and identify plant specimens and make their own *Wildlife Data Cards* similar to the *Grizzly Food Data Cards* on the diskette(s). The *Cards* will include preserved flower specimens for identification purposes, and background information on the collected specimen.

The resulting class collection is useful for future reference regarding local flora.

Materials
Photocopies of the *Wildlife Data Card Worksheet* provided on page 78 of this classroom guide, preferably photocopied onto card stock. Materials needed to preserve specimens (see Procedure).

Procedure
This activity is most effective if it is done after the students have had practice with using the *Grizzly Food Data Cards* on the diskette(s) and after you have discussed the value of classifying things for organizational purposes.

Inform the class that they are going to make a special collection of *Data Cards* for local flora. You may decide upon a particular theme (e.g., spring wildflowers, leaves from one ecosystem, flowers eaten by a selected animal, etc.)

Students may work independently or in groups. The specimens collected will depend upon the location of the school and the local distribution of wildlife. Try to collect a wide variety of samples. Check for any endangered or protected species in the area (which should not be picked). Encourage only one or two specimens per student, and discuss the implications of over-collecting.

Have the students collect their specimens. Provide them with photocopies of the *Wildlife Data Card Worksheet* on page 78 of this classroom guide, and a botanical key or other reference material with which the students can identify their specimens. They should record the genus, species and common names on the worksheet. Further research may be needed to fill in the other information, which may include ways in which the plant is important to people.

Students need to preserve their specimens between layers of absorbent paper under a weight. Newspapers, old telephone directories and paper towels work well. Use multiple layers above and below the specimen. The paper should be changed a few times the first day and then left undisturbed for three weeks.

If the specimens are small, they may be transferred directly onto the *Wildlife Data Cards*. If size

prohibits this, they may be transferred onto card stock to be include with each *Card.* Students may also draw the flower/leaf/fern on the *Card* for reference and then use their dried specimens as part of another art project (see Extension).

When the specimen is dried, use one of these three techniques to transfer it to card stock:

a) Put the specimen on a piece of waxed paper the same size as the card stock. Cover it with a single layer of facial tissue. Mix one part white glue with one part water. Using a stiff-bristled brush, apply the glue mixture over the surface of the tissue with a blotting motion (hold the brush vertically). Saturate the tissue with the solution, and then leave it to dry. Later, place the specimen in a brown paper bag, and iron it on the iron's "silk" setting. Trim any excess tissue.

b) Cut waxed paper to twice the size of the card stock. Fold it in half, then open it and place the pressed specimen on one half. Fold the waxed paper over the specimen, cover it with one layer of newspaper, and press it with a warm iron (don't over-iron). The waxed paper should seal. Touch up any holes with shaved paraffin (candle wax).

c) Cut a piece of clear contact paper to the same size as the card stock. Place the pressed specimen on the face of the card. Peel the contact paper, and place it over the specimen. Smooth the contact paper carefully, starting from the middle and working outward.

Have the students share their *Wildlife Data Cards,* and then decide on a system for filing the *Cards* for future reference. Students may choose to file alphabetically by common name, by genus, by habitat, etc.

Extension
Put the *Data Cards* to use, and go on a plant-identifying walk.

Draw a picture of the plant on the *Wildlife Data Card,* and use the dried specimen to design greeting cards. Have students include some of the information about the plant on their cards, and then exhibit, exchange or mail them.

Evaluation
In the field, identify one flower specimen by common name and scientific name, and give an interesting fact about it.

14. Does Wildlife Sell Cigarettes?

- **Concepts:** human impact on the wilderness, interdependence
- **Goals:** to foster a positive attitude toward nature, encourage rational and creative thinking processes, develop communication skills
- **Grades:** 6 - 12
- **Subjects:** language arts (communication media, semantics), social studies, business, creative arts
- **Skills:** analysis, classification, discussion, evaluation, observation, reading
- **Grouping:** any
- **Location:** indoors
- **Time:** two 45-minute periods
- **Key words:** stereotype, metaphor, advertising

Description
Students will evaluate and categorize advertisements.

Objective
The students will be able to: 1) identify the use of wildlife and other natural images in advertising, 2) critically analyze and evaluate the purposes and impacts of using such images in advertising, and 3) recommend appropriate uses of wildlife images in advertising.

Background
A cowboy boot manufacturer ran a series of advertisements for its boots showing boot wearers in conflict with wildlife. In one case, the wearer of the boot is about to kill a rattlesnake and a scorpion. There is a sense of drama in the ads — with the boot raised in the air, ready to flatten the offenders. This portrays a person in battle with forces of nature, and it plays on the stereotype that such actions require some sort of virtuous strengths. It also plays on the belief that some animals are worthless and should be killed.

In contrast with the images chosen by this advertiser, the rattlesnake and the scorpion could have been portrayed as integral components of natural ecosystems in the western United States. The luster and patterning of the snake's scales, and the grace of motion of both of the animals could be portrayed. Fewer boots would likely be sold, since the marketplace may still be steeped in many stereotypes around the fears upon which the first ad plays. One could imagine, however, the kind of advertising campaign that Edward Abbey, Annie Dillard or Ansel Adams might design.

In a certain sense, the grizzly bears in *Story 2: Bear Encounters* on the diskette(s) are victims of poor press. Bears are often seen as docile, trained animals, or as friends of people in movies and on TV. This gives the false impression that bears are friendly, and it leads people to act with less caution than is appropriate around these large, wild carnivores.

Contemporary advertising often exploits people's biases and emotional responses to elements of nature. Advertising, by design, is intended to evoke a response — one that will lead to buying the advertised product.

The major purpose of this activity is to have students evaluate the uses and impacts of nature-derived images in advertising.

Materials
Magazines or newspapers as sources of advertisements.

Procedure
1. Ask each student to find at least one advertisement that makes use of some aspect of the natural environment in order to sell its product. The advertisement might show crystal waters, an eagle soaring the skies, an elk standing majestically, a forested hillside, snow-capped peaks, etc. If the advertisement is on a billboard, perhaps the student can photograph it; if it is from a television commercial, a sketch and/or a description will work.

2. Working as individuals or in small groups, ask the students to examine their advertisements according to questions such as the following:
- What is the advertiser's purpose?
- What image from nature is used to sell the product?
- Does the image have any direct relationship to the product?

- If yes, what is that relationship?
- If no, what purpose does the image serve for the advertiser ?
- What feelings does the ad elicit?
- What stereotypes, if any, does the ad encourage or build upon?
- If not a stereotype based upon people's reactions to the image portrayed, does the ad portray a metaphor as a means to sell its product? If yes, describe its purpose. For example, a porcupine might be pictured alongside an electric shaver with the caption, "Get rid of the bristles." The porcupine's quills serve as a metaphor for a stubbly beard.
- Does the advertisement seem to portray the natural image in a realistic way? Describe what seems realistic and what does not.
- Identify and describe any ways in which the ad might contribute to practices that could be wasteful, destructive, inappropriate, etc. in terms of the wise use of natural resources and the environment.

3. According to criteria the students establish and explain, ask them to categorize the advertisements as an appropriate or inappropriate means by which to attempt to sell products.

Extension

1. For advertisements considered inappropriate, i.e., harmful or misleading, the students could:
a) redesign the advertisement to make it more appropriate;
b) write a letter to the advertiser explaining their concerns;
c) write a letter to the editor of the magazine or newspaper in which the ad appeared;
d) write an editorial about the ad for a city or school paper;
e) call other people's attention to the ad.

2. For advertisements considered appropriate, i.e. constructive or accurate, the students could:
a) write a letter to the advertiser in praise of the ad, explaining the bases for the students' opinions, etc.;
b) call other people's attention to the praiseworthy ad.

3. Design advertisements to encourage the wise use of natural resources and responsible actions toward people, wildlife and the environment. Send these ideas, with courteous letters of concern and explanation, to the advertising departments of companies that would seem most able to benefit from them .

Evaluation

Use your computer to write a paragraph on each of the following:

- Describe two examples of advertisements which portray animals in informative, accurate or positive ways.
- Describe two examples of advertisements which portray animals in inaccurate, misleading or negative ways.
- How, if at all, does the use of wildlife help the image advertisers wish to portray?
- How, if at all, do the ways in which wildlife is used in advertising help wildlife? Harm wildlife?
- Describe a way that advertisers could use wildlife to the best advantage of both wildlife and the advertisers.
- Describe what you believe would be the most responsible and appropriate ways to include wildlife in advertising, if at all.

15. How Many Bears Can Live in the Forest?

- **Concepts:** habitat, evolution, data collection, organization, forming hypotheses
- **Goals:** to foster a positive attitude toward living things, to encourage rational and creative thinking processes, to develop scientific knowledge
- **Grades:** 4 - 9
- **Subjects:** science, social studies, mathematics, physical education
- **Skills:** analysis, computation, discussion, evaluation, generalization, kinesthetic concept development, listing, observation, psychomotor development, graphing, charting
- **Grouping:** any (adjust number of food squares per size group; less than 80 pounds of food per student)
- **Location:** outdoors and indoors
- **Time:** 20 - 45 minutes or longer
- **Key words:** carrying capacity, limiting factor, habitat

Description
Students will become "bears" to look for "food" in a "habitat" during this physical activity.

Objective
Students will be able to: 1) define *carrying capacity*, and 2) describe the importance of carrying capacity for wildlife and people.

Background
In *Story 4: Oil Explorer* on the diskette(s), students explore the concept of carrying capacity as they learn about oil drilling and the space-limiting factors of development in grizzly habitat. Students learn about the habitat's carrying capacity of grizzly food reserves in *Story 1: On the Spot with Dr. Potts* on the diskette(s).

Carrying capacity may be defined as the ability of a given unit of habitat to supply food, water, shelter and necessary space to a wildlife species. It is the largest population that can be supported on a year-round basis, or during the most critical season. Carrying capacity varies throughout the year — and varies from year to year — depending upon conditions within the habitat, such as rainfall, competition from domestic animals, etc.

An area of bear habitat can support only the number of bears which can be carried at the lowest ebb of the season or year. Surplus animals, born in richer seasons, must be lost to some *limiting factor* during the harsher season.

The major purpose of this activity is to have students understand *carrying capacity* as seen from the perspective of black bears. It should be carried out after a lesson about *adaptation* and *limiting factors*.

Materials
Five colors of construction paper (2 - 3 sheets of each color); one black felt pen; envelopes (1 per student); pencils; one blindfold.

Procedure
1. Cut the paper or poster board into 2" x 2" or 2" x 3" pieces. For a classroom of 30 students, make 30 cards of each color, and mark them to represent the type of food and the number of pounds of each type as follows:

- Orange — **Nuts** (acorns, pecans, walnuts, hickory nuts). Mark 5 pieces N-20; 25 pieces N-10.
- Blue — **Berries** (blackberries, elderberries, raspberries). Mark 5 pieces B-20; 25 pieces B-10.
- Yellow — **Insects** (grub worms, larvae, ants, termites). Mark 5 pieces I-12; 25 pieces I-6.
- Red — **Meat** (mice, rodents, peccaries, beaver, muskrats, young deer). Mark 5 pieces M-8; 25 pieces M-4.
- Green — **Plants** (leaves, grasses, herbs). Mark 5 pieces P-20; 25 pieces P-10.

The following estimates of total pounds of food for one bear in ten days are used for this activity:*

Nuts	20 pounds =	25%
Berries	20 pounds =	25%
Insects	12 pounds =	15%
Meat	8 pounds =	10%
Plants	20 pounds =	25%
Total	80 pounds =	100% in 10 days

** These figures are based on actual research data from a study in Arizona, indicating a mature black bear could typically eat about eight pounds of food per day in a ten-day period.*

Keeping these figures in mind, make and distribute the appropriate number of food cards for your size group of students. There should be less than 80 pounds of food per student, so that there is not

enough food for all of the "bears" to survive.

2. In a fairly large open area (e.g., 50' x 50'), scatter the colored pieces of paper.

3. Have each student write his or her name on an envelope. This will represent the student's "den site," and it should be left on the ground (perhaps anchored with a rock) at the starting line on the perimeter of the field area.

4. Have the students line up on the starting line, leaving their envelopes between their feet on the ground. Give them the following instructions: "You are now all black bears. All bears are not alike, just as you and I are not exactly alike. Among you is a young male bear who has not yet found his own territory. Last week he met up with a larger male bear in the big bear's territory, and before he could get away, he was hurt. He has a broken leg. (Assign one student as the injured bear. He must hunt by hopping on one leg.) Another bear is a young female who investigated a porcupine too closely and was blinded by the quills. (Assign one student as the blind bear. She must hunt blindfolded.) The third special bear is a mother bear with two fairly small cubs. She must gather twice as much food as the other bears. (Assign one student as the mother bear.)"

5. Do not tell the students what the colors, initials and numbers on the pieces of paper represent. Tell them only that the pieces of paper represent various kinds of bear food; since bears are omnivores, they like a wide assortment of foods, so they should gather different colored squares to represent a variety of food.

6. Students are to walk into the "forest" and search for a colored square. Stress that all players must walk, since bears do not run down their food — they gather it. When students find a colored square, they should pick it up (one at a time) and return it to their "den" before picking up another colored square. (Bears would actually eat food as they find it, but this activity is simulating natural gathering by asking players to return to their "den" with each square). Also, bears avoid fights and confrontations, since any injury might lead to starvation. So no pushing or shoving is allowed.

7. When all of the colored squares have been gathered, the hunting is over. Have the students pick up their envelopes, and return to class.

8. Explain what the colors and numbers represent. Ask each student to add up the total number of pounds of food he or she gathered — whether it is nuts, meat, insects, berries or plant materials. Each should write the total on his or her envelope.

9. Using a chalkboard, list "blind," "injured," and "mother." Ask the blind bear how much food she got. Write the amount after the word "blind." Ask the injured bear and the mother bear how much they got, and record the information. Ask each of the other students to tell how much food they found; record each response. Add the poundage gathered by the entire class. This is the total amount of food available in this particular bear habitat. How many bears are there? Divide the total pounds available by the number of bears to find out how much is available for each bear.

Tell the students each bear needs 80 pounds to survive. Is there enough to feed all the bears? How many bears can live in this area? What would happen to the extra bears? Would they all starve? How many pounds did the blind bear collect? Will she survive? What about the mother bear? Did she get twice the amount needed to survive? What will happen to her cubs? Will she feed cubs first, or herself? Why? What would happen to her if she fed the cubs? What if she ate first?

10. Discuss with the class that *carrying capacity* also holds true for the earth and humans — the earth can only support so many.

Extension
Explain why carrying capacity is important for wildlife. Explain why carrying capacity is important for people.

Evaluation
Define carrying capacity.

Describe some of the factors which determine carrying capacity for a species of animal.

WORKSHEETS

Endangered! – Debate *(from the activity on page 40)*

Photocopy this page, then cut the photocopies along the dotted lines, and assign one position to each group of students.

A. Programs to save endangered species are not worth the government's expense of time and money, especially since they limit our freedom to use land for other purposes, such as logging, mining or residential development.

B. Programs to save some endangered species should be carried out, but they should have low priority in governmnent funding, because we don't need to preserve every species on the planet. Growing food and meeting human needs for shelter are more important.

C. Endangered species should be saved, because the genetic resources of a particular plant or animal may be beneficial to humanity as a medicine, food or other resource in the future. One-third of our medicines are obtained directly or indirectly from plants.

D. Government programs should make a strong effort to save all endangered species by preserving critical habitat, regardless of the costs or the limits placed upon the freedom to use the land for other purposes. All species have the right to protection. They have aesthetic value, and each species is part of a functioning ecosystem which may break down if that species becomes extinct.

Create a School Critter – Design Draft *(from the activity on page 42)*

Use this outline to design your critter so that it is well adapted to survive in its habitat. Write about the specific habitat you have chosen for your critter and about its survival needs.

HABITAT: _____

_____

_____

Possible threats in habitat: _____

_____

Food sources in habitat: _____

_____

Terrain: _____

_____

DESIGN CONSIDERATIONS:

Type of protective covering needed (see threats): _____

_____

Appendages and sensory organs needed for food gathering (see food sources): ____

_____

Mode of locomotion (see terrain): _____

_____

Other design considerations: _____

_____

_____

Home Away From Home – Design Draft *(from the activity on page 48)*

Use this outline to help you in designing your grizzly bear zoo space.

VEGETATION: _____

_____

SHELTER:

To protect the bear _____

To provide privacy _____

To protect visitors _____

FOOD/WATER SOURCE: _____

_____

FEEDING TIMES/METHODS FOR PROVIDING FOOD & WATER: _____

_____

CLIMATE CONTROL:

Temperature _____

Humidity _____

Air pressure _____

Wind _____

Snow /ice _____

LIGHTING:

Length of day/night _____

Seasonal considerations _____

Intensity _____

GROUPING OF BEARS (by sex, age, numbers): _____

_____

CARE FOR YOUNG: _____

CAGE MAINTENANCE:

Cleaning _____

Vegetation upkeep _____

Beary Cooperative – Cards *(from the activity on page 50)*

Photocopy this page, then cut along the dotted lines for a set of six *Beary Cooperative Cards.*

Card #1: *Read these clues to the group, but don't show them this card.*

- Your group task is to identify the season the "Kamper" family visited Yellowstone Park. The answer can be found with these group clues.
- A park ranger spotted a mother grizzly with a cub about 7 months old, and he warned the Kampers to keep their distance.

Read these clues to the group, but don't show them this card.

- Grizzlies mate in May and June.
- Through the telephoto lens of his camera, Mr. Kamper saw a large number of grizzly bears gathering at Rush Creek.

Read these clues to the group, but don't show them this card.

- The gestation period for a baby grizzly is about 8 months.
- One wildlife biologist told Joey Kamper that Bear #83 has been noticeably gaining weight.

Read these clues to the group, but don't show them this card.

- Unsecured garbage recently attracted Bear #73 into a camp site just down the hill from the Kampers!
- Although grizzly bears usually live alone, they gather together to eat when there is a lot of food in one small area.

Read these clues to the group, but don't show them this card.

- Mrs. Kamper saw a grizzly eating grass and sedge in the valley.
- Pine nuts are an important food for grizzly bears in the fall.

Read these clues to the group, but don't show them this card.

- Mary Kamper, a biology student, identified some bear scat near a berry shrub.
- The grizzly bears in the lower 48 states usually hibernate from November to April.

Bear Cafe – Menu *(from the activity on page 52)*

APPETIZERS

ENTRES

DESSERTS

Incident Report – Form *(from the activity on page 54)*

CLASS ALERT!

SITUATION: _____

_____

_____

_____

QUESTIONS:

1) _____ **yes / no**

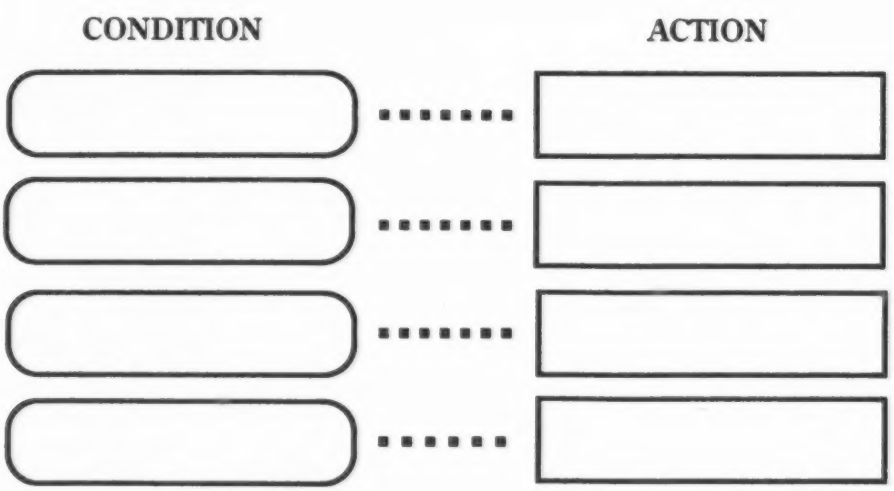
2) _____ **yes / no**

3) _____ **yes / no**

4) _____ **yes / no**

5) _____ **yes / no**

6) _____ **yes / no**



Ant Antics – Worksheet *(from the activity on page 56)*

1. Look for an ant hill outside. Are the ants carrying food? How much food can an ant carry relative to its body size? Do they pay attention to one another?

2. Watch the way the ants move along "trails," Place an obstacle in the path of an ant. How does it get around the object?

3. What do you think ants like to eat? Place different kinds of food near their trails, and see what they do. Foods: cheese, bread, and small amounts of sugar. Using a stopwatch, see how long it takes an ant to go to the food.

4. How fast do ants travel? Measure off one foot of space along the ground or sidewalk. Use a stopwatch to see how many seconds it takes an ant to travel one foot. Time three runs, and find the average speed the ant travels. How far could the ant travel in one hour?

What's My Ecosystem? – Worksheet *(from the activity on page 60)*

Choose an ecosystem of interest to you, and find out who lives in the system and how the components or members of it interact. Keep your choice a secret. Find out as much as you can, because your classmates will be asking you questions as they try to figure out which ecosystem you studied. Use additional sheets of paper to record your answers, if necessary.

Physical environment
Describe the physical environment of the ecosystem you research. Be specific and include information on rainfall, temperature, and light conditions.

Producers
Name at least three producers in the ecosystem.

Consumers
Who are the herbivores?

Who are the carnivores? Which herbivores are part of their diets?

Who are the omnivores?

Who are the decomposers?

Construct a food chain which shows how some of the members of the ecosystem are interdependent.

Where do humans fit into this ecosystem? Has human activity had any impact on this ecosystem? Explain.

Wildlife Data Card – Worksheet *(from* Preserving Specimens *on page 62)*

COMMON NAME:

SCIENTIFIC NAME:

KINGDOM:

KIND:

HABITAT:

DANGERS:

PEAK FOOD VALUE:

EDIBLE PORTION:

FOOD SOURCE FOR WHAT ANIMALS/INSECTS:

IMPORTANT TO PEOPLE IN WHAT WAY:

Advertisement Motives – Worksheet *(from* Does Wildlife Sell Cigarettes? *on page 64)*

Find an advertisement that makes use of some aspect of the natural environment in order to sell its product. Examine this advertisement through the following questions:

1. What is the advertiser's purpose?

2. What image from nature is used to sell the product?

3. Does the image have any direct relationship to the product?

4. If yes, what is that relationship?

5. If no, what purpose does the image serve for the advertiser trying to sell the product?

6. What feelings, if any, does the ad elicit?

7. What stereotypes, if any, does the ad encourage or build upon?

8. If not a stereotype based on people's reactions to the image portrayed, does the ad portray a metaphor as a means to sell its product? If yes, describe its purpose. For example, a porcupine might be pictured alongside an electric shaver with, "Get rid of the bristles." The porcupine's quills serve as a metaphor for a stubbly beard.

9. Does the advertisement seem to portray the natural image in a realistic way? Describe what seems realistic and what does not.

10. Identify and describe any ways in which the ad might contribute to practices that could be wasteful, destructive, inappropriate, etc., in terms of the wise use of natural resources and the environment.

The Bear Country Handbook – On-Line Worksheet

Refer to *The Bear County Handbook* in *Story 1: On the Spot with Dr. Potts* on the diskette(s) to answer the following questions on another piece of paper. *(from* Endangered! *on p. 41)*

Looks

1) What does a grizzly look like?
2) How much can a male grizzly weigh in the lower 48 U.S. states?
3) What is one way to tell a grizzly from a black bear?

Habits

4) How far might a grizzly travel in one year?
5) Why are grizzlies found at many elevations in the summer?
6) What grizzlies are guaranteed to be very aggressive?
7) What is an example of a non-threatened grizzly's behavior?
8) What is an example of a threatened grizzly's behavior?

Studying

9) How many years have radio collars been used to study grizzlies?
10) What information can a wildlife biologist gather from a grizzly wearing a radio collar?

Garbage

11) Why did U.S. national parks leave open garbage pits in past years?
12) Why did U.S. national parks close these garbage pits?

History

13) In 1930, in what western U.S. states were grizzlies found?
14) What is one reason that the grizzly population has decreased over the years?
15) What year was the grizzly listed as "threatened" in the lower 48 U.S. states?

Today

16) What year was the U.S. Grizzly Recovery Plan prepared?
17) What agencies and/or organizations work to protect the grizzly?
18) What is an "ecosystem?"
19) Why is the grizzly referred to as an "umbrella" species?
20) What is the grizzly referred to as an "indicator" species?

Visiting

21) Name four types of safe behavior in grizzly country.
22) What campsites should you avoid while in grizzly country?
23) How should food be prepared, stored and disposed of in grizzly country?
24) What should you do if you see a grizzly?
25) What should you do if a grizzly charges?

The Bear Country Handbook – On-Line Worksheet **Answer Key**

Looks

1) *humped shoulder, concave face, long curved front claws, fur has long guard hairs that are lighter at the tips which gives fur silvery appearance*
2) *300 - 850 pounds*
3) *grizzly has large hump of muscle between its shoulders; generally black bears are smaller and look darker*

Habits

4) *the grizzly's home range varies from 100 square kilometers to 2500 square kilometers per year*
5) *grizzlies travel in search of food, and food is available at many elevations in the summer*
6) *a mother bear with cubs, a male in mating season (June), a bear defending food*
7) *standing on hind legs with nose in the air, standing ground or retreating*
8) *chomping, jaws "whoffing," head held low with ears laid back, advancing toward disturbance*

Studying

9) *30 years*
10) *they can learn what the bear eats at each time of year, whether or not it mates, when and where it makes a den, about encounters with other animals*

Garbage

11) *to attract grizzly bears into areas populated with tourists*
12) *grizzlies became too comfortable around people, making it dangerous for both people and bears*

History

13) *Oregon, New Mexico, Arizona, Colorado, Montana, Wyoming, Washington, Idaho*
14) *grizzlies have been killed by hunters, trappers, ranchers, and because of park service policy; also loss of habitat*
15) *1975*

Today

16) *1982*
17) *state and federal agencies, private organizations including National Audubon Society*
18) *a community of species that all depend on one another and the surrounding air, soil and water for their survival*
19) *the protection and management of the grizzly provides protection to other species in the same ecosystem*
20) *the grizzly's survival is an indication of the overall health of the ecosystem — if they disappear, other species in the same area are probably also in danger*

Visiting

21) *never surprise a grizzly, be careful if traveling near rushing water or into the wind, abide by all local regulations and closures, don't bring a dog, travel in groups of four or more, make noise while hiking, don't travel at night, watch for grizzly signs (droppings, fresh tracks, diggings) on the trail, respect the grizzly's strength, power and speed — keep your distance!*
22) *by the shore of a lake or stream, at the bottom of a narrow canyon, at the low point on a pass, at a berry patch*
23) *keep food odors to a minimum, place sleeping bags and tent far from outdoor kitchens, don't sleep in cooking clothes, lock food inside of a car if you have one, don't leave any food or coolers out, keep fresh food 10 feet off the ground and 100 yards from camp, burn leftover scraps or store with fresh food and then pack out*
24) *don't run away, stay far away, circle slowly upwind*
25) *climb a tree if you can get up at least 20 feet before the bear gets there, play dead by rolling up in a ball*

Data Card Search – Student Worksheet

Use the *Data Card* search option in *Story 1: On the Spot with Dr. Potts* on the diskette(s) to find the following information about the grizzly's diet. *(from* Ant Antics *on page 57)*

1) List the common names of two insects that the grizzly eats.

a)_____
b)_____

2) How does a grizzly find ants?

_____

3) Find three animals that the grizzly would most likely find in a meadow — write their common names:

a)_____
b)_____
c)_____

4) List the names of two plants found in the woods that are a food source for the grizzly — write their scientific names:

a)_____
b)_____

5) Which plant might the grizzly find on a dry plain in the spring? Write its common name.

_____

Want to find out more about the grizzly diet? Here are a few possible categories to search under. Try mixing and matching using the **AND** / **OR** search modes. Be sure to read the **NOTES** on each *Card* for additional information. Record your findings on another piece of paper.

KINGDOM: animal, plant

GROUP: insect, shrub, horsetails, forb, tree, mammal/swine, mammal/rodent, mammal/deer, mammal/cow

HABITAT: plains, meadows, streams, rangeland, woods, hillside, campsites

SEASON: spring, summer, fall

Data Card Search – Student Worksheet

Answer Key

Use the *Data Card* search option in *Story 1: On the Spot with Dr. Potts* on the diskette(s) to find the following information about the grizzly's diet.

1) List the common names of two insects that the grizzly eats.
   a) *ants*
   b) *grasshoppers*
   c) *honeybees*

2) How does a grizzly find ants?
   by digging them up with their powerful claws

3) Find three animals that the grizzly would most likely find in a meadow — write their common names:
   a) *clover*
   b) *dandelions*
   c) *yampah*

4) List the scientific names of two plants found in the woods that are a food source for the grizzly — write their scientific names:
   a) *Perideridia gairdneri (yampah)*
   b) *Vaccinium Spp. (huckleberry)*
   c) *Rubus Spctabilis (salmonberry)*

5) Which plant might the grizzly find on a dry plain in the spring? Write its common name.
   Biscuitroot

Want to find out more about the grizzly diet? Here are a few possible categories to search under. Try mixing and matching using the **AND / OR** search modes. Be sure to read the **NOTES** on each *Card* for additional information. Record your findings on another piece of paper.

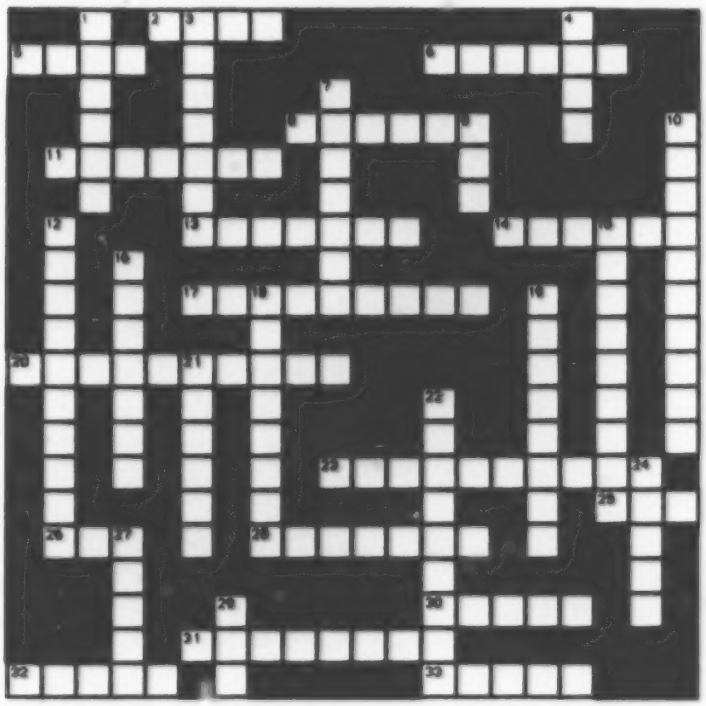
KINGDOM: animal, plant

GROUP: insect, shrub, horsetails, forb, tree, mammal/swine, mammal/rodent, mammal/deer, mammal/cow

HABITAT: plains, meadows, streams, rangeland, woods, hillside, campsites

Bears Squares: Puzzle 1 *(from* Beary Cooperative *on page 50)*

Review the *Bear Country Handbook* in *Story 1: On the Spot with Dr. Potts* on the diskette(s), then try to solve these crossword puzzles. Answers can be found on page 87.



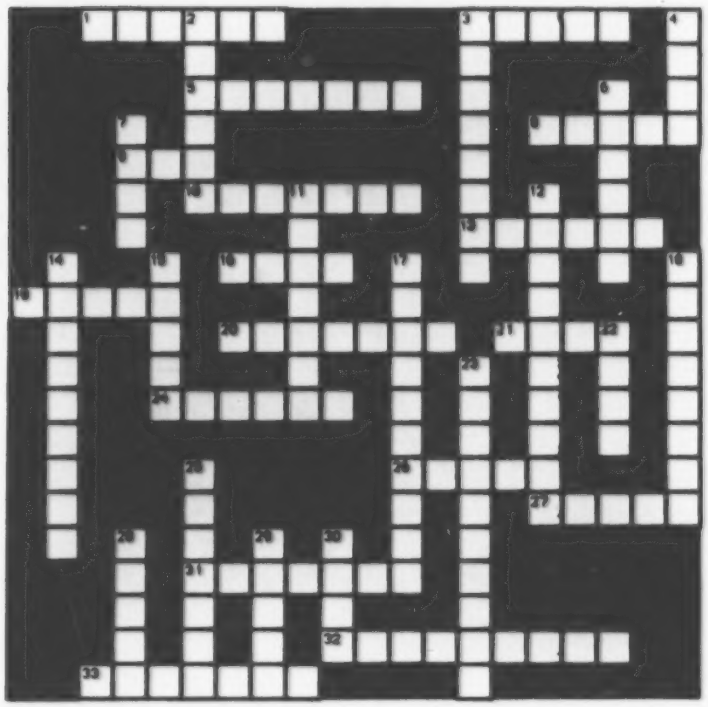
Across

2. What biologists collect and study
5. Describes grizzly memory
6. Shape of grizzly shoulder
8. Black bears are __ than grizzlies
11. U.S. state grizzlies are found in today
13. Grizzly appearance
14. A bear likely to be aggressive
17. A community of species
20. No grizzlies here since 1922
23. Scientists who study animals
25. Large member of deer family
26. Don't bring to grizzly country
28. Grizzlies may become _____
30. Used for tearing food
31. _____ biologists study bears
32. Home for elk in winter
33. Former problem in parks

Down

1. Where grizzlies eat clover
3. Biologists use radio _____ to study grizzlies
4. If you see a grizzly, play ____
7. A radio collar is powered by a _____
9. What NOT to do if you see a grizzly
10. Grizzly species name
12. Species declining in population and in danger
15. What bears do in winter
16. The area bears need to live
18. Eats plants and meat
19. Sound a threatened grizzly makes
21. Grizzlies disappeared from this U.S. state in 1931
22. A bear that has been moved to a remote area
24. Hibernation is similar to this
27. Hairs found on grizzly fur
29. Grizzly size

Bear Squares: Puzzle 2 *(from* Beary Cooperative *on page 50)*



Across

1. Root eaten by Native Americans and grizzlies
8. Berries are found on a _____
9. Grizzly food found on pine cone
10. The grizzly is a threatened _____
13. U.S. state where most grizzlies live
16. Found on coniferous tree
19. You may surprise a grizzly near rushing _____
20. Black bears are usually _____ than grizzlies
21. Plants make up most of a grizzly's ____
24. Season grizzlies are found at many elevations
26. U.S. state that grizzlies are found in today
27. Make _____ when hiking in grizzly country
31. A summer food liked by bears and birds
32. A flower that grizzlies and deer eat in summer
33. Grizzlies eat plants, animals and _____

Down

2. Large part of grizzly diet
3. People threaten grizzly ____
4. A lily is a flowering _____
6. Sign of grizzlies in the area
7. Insect that grizzlies eat
11. Shape of grizzly face
12. Few grizzlies found here
14. Meat-eater
15. Grizzly genus
17. In summer, grizzlies can find food at many _____
18. Keep your _____ from a grizzly
22. If grizzly charges, climb a _____
23. Close to extinction
25. Never leave this when camping
28. Hoofed mammal that is a grizzly food
29. Food for bears and eagles
30. Avoid hiking into the _____

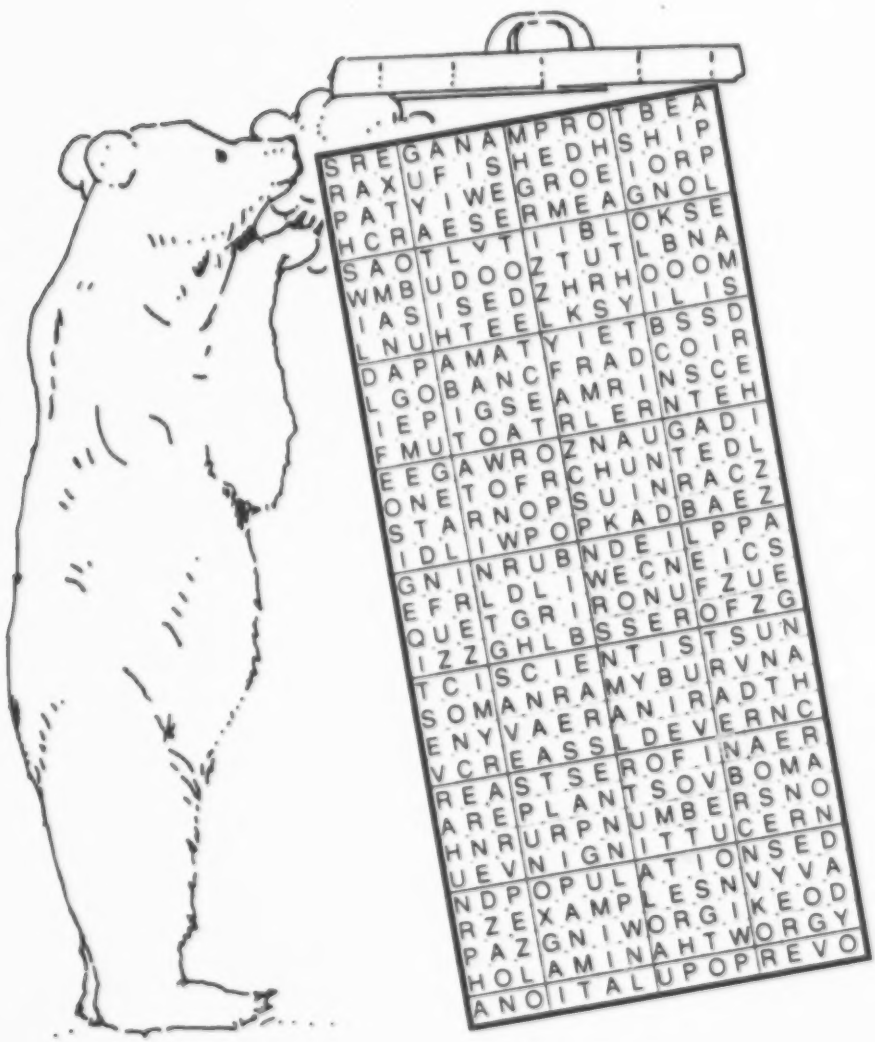
Can Find Worksheet *(from* Incident Report *on page 54)*

(The paragraphs on this page tell a lot about wildlife management. For more information about wildlife management, see page 24 in *Part Two: The Bear facts: Q & A* of this classroom guide. Read how scientists help the grizzly, and then find the **bold** print words hidden in the garbage can on the next page. Answers can be found on page 88.)

How do **scientists** help the **grizzly**? The **information** that they gather is used to make many **decisions** that will help the grizzlies to **survive**. Their **research** shows how many **bears** there are, how much room they need, and whether their **numbers** are **growing** or **shrinking**. Partly based on this information, the **government** will decide how the bears can be best **protected**.

The **field** of **science** that tries to protect and **save** animal **populations** in the **wild** is called wildlife **management**. **Wildlife** management originally dealt with animals that can be **hunted** or **fished**. Today's managers are more **concerned** with the needs of all wildlife. Wildlife management is a type of **applied** science. A **biologist** may study the grizzly just to **learn** more about it. But a scientist who is involved in wildlife management will use that information to make **changes** in the grizzly's **habitat**.

One of the good **examples** of the results of successful wildlife management is the increase in the **deer** populations in many parts of the country. Wildlife managers help increase deer populations by **cutting** or **burning** open areas in **forests** to **permit** the **growth** of the **plants** that deer eat. The **managers** also plan hunting seasons to control the **harvest** of deer, to prevent **overpopulation** and to keep the deer herd **healthy**.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RAXUFISHEDHSHIP
PATYIWEGROEIORP
HCRAESERMEAGNOL
SAOTLVTIIBLOKSE
WMBUDOOZTUTLBNA
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LNUHTEELKSYILIS
DAPAMATYIETBSSD
LGOBANCFRADCOIR
IEPIGSEAMRINSCE
FMUTOATRLERNTEH
EEGAWROZNAUGADI
ONETOFRCHUNTEDL
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IDLIWPOPKADBAEZ
GNINRUBNDEILPPA
EFRLDLIWECNEICS
QUETGRIRONUFZUE
IZZGHLBSSEROFZG
TCISCIENTISTSUN
SOMANRAMYBURVNA
ENYVAERANIRADTH
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Bear Squares Answer: Puzzle 1

(from page 84)

Across

2. Scat
5. Keen
6. Humped
8. Darker
11. Montana
13. Silvery
14. Mother
17. Ecosystem
20. California
23. Biologists
25. Elk
26. Dog
28. Extinct
30. Teeth
31. Wildlife
32. Woods
33. Dumps

Down

1. Meadow
3. Collars
4. Dead
7. Battery
9. Run
10. *Horribilis*
12. Threatened
15. Hibernate
16. Habitat
18. Omnivore
19. Whoofing
21. Oregon
22. Relocated
24. Sleep
27. Guard
29. Big

Bear Squares Answer: Puzzle 2

(from page 85)

Across

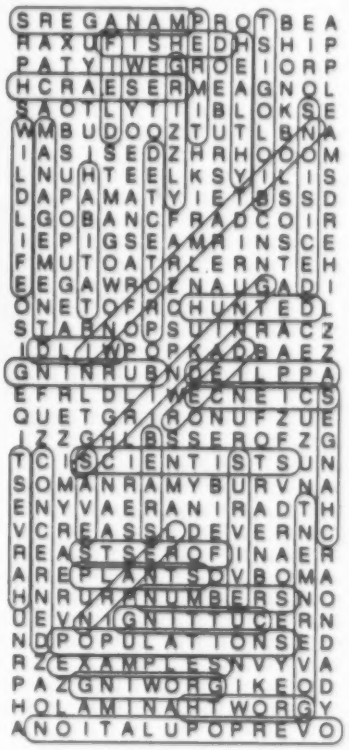
1. Yampah
3. Sheep
5. Animals
8. Shrub
9. Nut
10. Species
13. Alaska
16. Cone
19. Water
20. Smaller
21. Diet
24. Summer
26. Idaho
27. Noise
31. Berries
32. Dandelion
33. Insects

Down

2. Plants
3. Survival
4. Forb
6. Tracks
7. Ants
11. Concave
12. Washington
14. Carnivore
15. *Ursus*
17. Elevations
18. Distance
22. Tree
23. Endangered
25. Garbage
28. Bison
29. Trout
30. Wind

Can Find Answer

(from page 87)



Glossary

adaptation a structural or functional change which makes an organism better suited to its environment

biome a large geographic area with somewhat uniform climatic conditions and characterized by a distinctive type of vegetation (e.g., grassland or desert)

camouflage a protective disguise or behavior that helps to hide by imitating natural surroundings

carrying capacity the number of animals a given area can support, dependent upon conditions within the habitat, such as rainfall

consumer a user of goods or services

diversity variety

ecosystem a community of organisms and their nonliving environment

endangered close to extinction

extinct no longer in existence

habitat the region where a species naturally lives; where food, water, shelter and space needs are met

indicator species a plant or animal whose presence in an area indicates certain environmental conditions

interdependence relationships, based upon need, between life forms in an ecosystem

limiting factors environmental influences in the life history of an animal which directly affect its population growth (e.g., food, water, shelter, space, disease, predation, climatic conditions, pollution, hunting, accidents)

resources a portion of an environment upon which people place or assign value or see as being available for use

species a group of individuals having certain attributes in common and capable of breeding to produce fertile offspring under natural conditions

threatened declining in number and potentially threatened if current trends continue

umbrella species the protection of an umbrella species provides similar protection to other species in the same ecosystem

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